National Défense
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A-CR-CCP-826/PF-001

ROYAL CANADIAN AIR CADETS

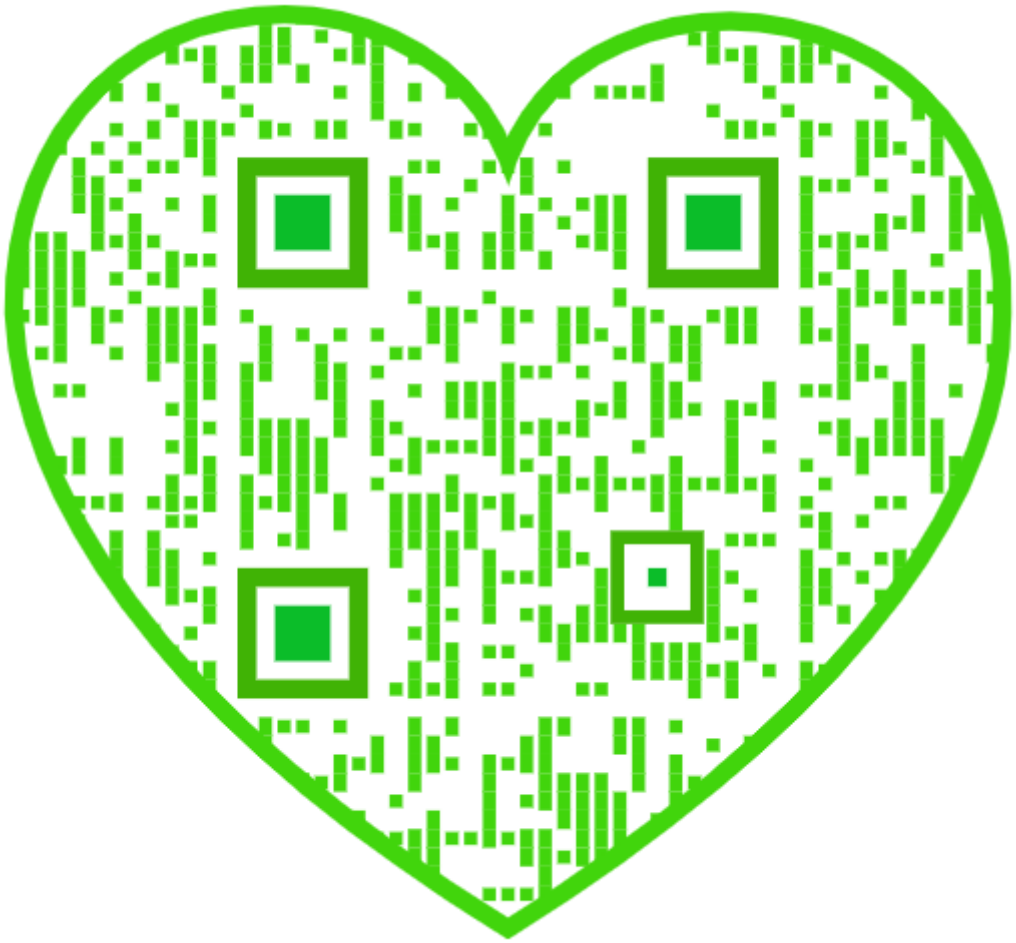
BASIC SURVIVAL TRAINING COURSE INSTRUCTIONAL GUIDES

(ENGLISH)

Cette publication est disponible en français sous le numéro A-CR-CCP-826/PF-002.

Issued on Authority of the Chief of the Defence Staff

Canada



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Page No.	Change No.	Page No.	Change No.
Cover page	0	1I-1 to 1I-2	0
Title	0	1J-1 to 1J-2	0
A to C	0	1K-1 to 1K-2	0
i to xii	0	1L-1 to 1L-4	0
1-1-1 to 1-1-32	0	1M-1 to 1M-2	0
1-2-1 to 1-2-10	0	1N-1 to 1N-2	0
1-3-1 to 1-3-8	0	1O-1 to 1O-2	0
1-4-1 to 1-4-20	0	1P-1 to 1P-2	0
1-5-1 to 1-5-26	0	1Q-1 to 1Q-2	0
1-6-1 to 1-6-8	0	1R-1 to 1R-2	0
1-7-1 to 1-7-6	0	1S-1 to 1S-2	0
1-8-1 to 1-8-12	0	1T-1 to 1T-2	0
1-9-1 to 1-9-6	0	1U-1 to 1U-12	0
1-10-1 to 1-10-8	0	1V-1 to 1V-2	0
1-11-1 to 1-11-8	0	1W-1 to 1W-2	0
1-12-1 to 1-12-8	0	1X-1 to 1X-2	0
1-13-1 to 1-13-12	0	1Y-1 to 1Y-2	0
1-14-1 to 1-14-4	0	2-1-1 to 2-1-12	0
1-15-1 to 1-15-22	0	2-2-1 to 2-2-6	0
1A-1 to 1A-2	0	2-3-1 to 2-3-6	0
1B-1 to 1B-2	0	2-4-1 to 2-4-22	0
1C-1 to 1C-2	0	2-5-1 to 2-5-6	0
1D-1 to 1D-2	0	2-6-1 to 2-6-24	0
1E-1 to 1E-2	0	2-7-1 to 2-7-24	0
1F-1 to 1F-2	0	2-8-1 to 2-8-20	0
1G-1 to 1G-2	0	2-9-1 to 2-9-14	0
1H-1 to 1H-2	0	2A-1 to 2A-2	0

LIST OF EFFECTIVE PAGES (Cont)

Page No.	Change No.	Page No.	Change No.
2B-1 to 2B-2	0	4-4-1 to 4-4-6	0
2C-1 to 2C-2	0	4-5-1 to 4-5-8	0
2D-1 to 2D-4	0	4-6-1 to 4-6-6	0
2E-1 to 2E-6	0	4A-1 to 4A-2	0
2F-1 to 2F-2	0	4B-1 to 4B-2	0
3-1 to 3-10	0	4C-1 to 4C-2	0
3A-1 to 3A-2	0	4D-1 to 4D-2	0
4-1-1 to 4-1-10	0	4E-1 to 4E-2	0
4-2-1 to 4-2-6	0		
4-3-1 to 4-3-14	0		

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FOREWORD AND PREFACE

1. **Issuing Authority.** These Instructional Guides (IGs) A-CR-CCP-826/PF-001 were developed under the authority of the Director Cadets in accordance with CATO 11-03, *Cadet Program Mandate*, CATO 11-04, *Cadet Program Outline and* CATO 51-01, *Air Cadet Program Outline*, and issued on the authority of the Chief of Defence Staff.

2. **Development.** Development of these IGs were in accordance with the performance-oriented concept of training outlined in the A-P9-050 Series, *Canadian Forces Individual Training and Education System*, with modifications to meet the needs of the Cadet Organization.

3. **Purpose of the IG.** The IGs are to be used by Cadet Summer Training Centres (CSTCs) to conduct Basic Survival Training Course, as outlined in CATO 11-04, *Cadet Program Outline* and CATO 51-01, *Air Cadet Program Outline*.

4. **Effective Date.** This publication is effective upon receipt. Subsequent changes are effective upon receipt.

5. **Suggested Changes.** Suggested changes to this document shall be forwarded through the normal chain of command to National Defence Headquarters (NDHQ) Attention: Air Cadet Program Development Staff Officer (D Cdts 3-2-6) or by e-mail to air.dev@cadets.net.

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TABLE OF CONTENTS

PAGE

CHAPTER 1	**PO S291 – PERFORM SURVIVAL SKILLS**	
Section 1	EO S291.01 – PERFORM MINOR FIRST AID IN A FIELD SETTING	1-1-1
Section 2	EO S291.02 – PARTICIPATE IN A SURVIVAL PSYCHOLOGY ACTIVITY	1-2-1
Section 3	EO S291.03 – ASSEMBLE AN EMERGENCY SURVIVAL KIT	1-3-1
Section 4	EO S291.04 – LIGHT A FIRE	1-4-1
Section 5	EO S291.05 – CONSTRUCT IMPROVISED SHELTERS	1-5-1
Section 6	EO S291.06 – CONSTRUCT A SIGNAL FIRE	1-6-1
Section 7	EO S291.07 – CONSTRUCT A GROUND-TO-AIR SIGNAL	1-7-1
Section 8	EO S291.08 – COLLECT AND PURIFY WATER	1-8-1
Section 9	EO S291.09 – IDENTIFY ANIMALS AND INSECTS FOR FOOD	1-9-1
Section 10	EO S291.10A – CONSTRUCT FISHING EQUIPMENT	1-10-1
Section 11	EO S291.10B – CONSTRUCT SNARES	1-11-1
Section 12	EO S291.11 – IDENTIFY METHODS OF PREPARING AND COOKING A SMALL ANIMAL OR FISH	1-12-1
Section 13	EO S291.12 – COLLECT EDIBLE PLANTS	1-13-1
Section 14	EO S291.13 – CONSTRUCT CAMP CRAFTS	1-14-1
Section 15	EO S291.14 – PREDICT WEATHER USING CLOUD FORMATIONS	1-15-1
Annex A	MAIN TEACHING POINTS REVIEW WORKSHEET	1A-1
Annex B	GROUND-TO-AIR SIGNALS	1B-1
Annex C	NUTRITION BREAKDOWN	1C-1
Annex D	COMMON POISONOUS PLANTS	1D-1
Annex E	COMMON POISONOUS PLANTS	1E-1
Annex F	LADDER BED	1F-1
Annex G	PACK FRAME	1G-1
Annex H	SHOWER	1H-1
Annex I	WASHSTAND	1I-1
Annex J	DRYING RACK	1J-1
Annex K	TOOL RACK	1K-1
Annex L	CAMP CRAFTS FOR COOKING	1L-1
Annex M	WHEELBARROW	1M-1
Annex N	COAT HANGER	1N-1
Annex O	SIMPLE BENCH	1O-1
Annex P	BENCH WITH BACK REST	1P-1
Annex Q	CAMP TABLE 1	1Q-1
Annex R	CAMP TABLE 2	1R-1
Annex S	CAMP TABLE 3	1S-1
Annex T	FRICTION LOCK TABLE	1T-1
Annex U	CLOUD PHOTOS	1U-1

TABLE OF CONTENTS (Cont)

		PAGE
Annex V	COMMON TYPES OF CLOUDS	1V-1
Annex W	COMMON CLOUD DESCRIPTIONS	1W-1
Annex X	CLOUD WEATHER SIGNS	1X-1
Annex Y	SAMPLE WEATHER SYSTEMS MAP	1Y-1
CHAPTER 2	**PO S292 – ASSIST WITH A FIELD EXERCISE**	
Section 1	EO S292.01 – ATTEND A FIELD SAFETY BRIEFING	2-1-1
Section 2	EO S292.02 – PACK CLOTHING AND EQUIPMENT FOR A FIELD EXERCISE.	2-2-1
Section 3	EO S292.03 – ASSIST WITH THE SET-UP OF AN EXERCISE SITE	2-3-1
Section 4	EO S292.04 – ERECT, TEAR DOWN AD PACK TENTS	2-4-1
Section 5	EO S292.05 – MAINTAIN PERSONAL HYGIENE IN THE FIELD	2-5-1
Section 6	EO S292.06 – TIE KNOTS AND LASHINGS	2-6-1
Section 7	EO S292.07 – USE TOOLS	2-7-1
Section 8	EO S292.08 – OPERATE A STOVE AND A LANTERN	2-8-1
Section 9	EO S292.09 – COMMUNICATE WITH A HAND-HELD RADIO	2-9-1
Annex A	SAMPLE KIT LIST	2A-1
Annex B	SAMPLE EXERCISE SITE	2B-1
Annex C	TENT PACKING PROCEDURE	2C-1
Annex D	KNOT-TYING INSTRUCTIONS	2D-1
Annex E	LASHING INSTRUCTIONS	2E-1
Annex F	SAMPLE MESSAGE WORKSHEET	2F-1
CHAPTER 3	**PO S297 – ASSIST WITH A GROUND SEARCH AND RESCUE (SAR) EXERCISE**	
	EO S297.01 – ACT AS A MEMBER OF A GROUND SEARCH AND RESCUE (SAR) PARTY	3-1
Annex A	SAMPLE BRIEFING	3A-1
CHAPTER 4	**PO S299 – PARTICIPATE IN GROUND NAVIGATION**	
Section 1	EO S299.01 – IDENTIFY PARTS OF A COMPASS	4-1-1
Section 2	EO S299.02 – DETERMINE DIRECTION USING THE SUN	4-2-1
Section 3	EO S299.03 – DETERMINE DIRECTION AT NIGHT	4-3-1
Section 4	EO S299.04 – USE BLAZING TECHNIQUES	4-4-1
Section 5	EO S299.05 – DETERMINE DISTANCE ALONG A ROUTE	4-5-1
Section 6	EO S299.06 – FOLLOW A MAGNETIC BEARING	4-6-1
Annex A	PARTS OF A COMPASS	4A-1
Annex B	CARDINAL POINTS	4B-1
Annex C	FINDING POLARIS	4C-1
Annex D	SKY MAP	4D-1
Annex E	BLAZING TECHNIQUES	4E-1

LIST OF FIGURES

FIGURE	TITLE	PAGE
1-1-1	Preparing the Roll	1-1-2
1-1-2	Making the Roll	1-1-3
1-1-3	Leg Position	1-1-3
1-1-4	Final Position	1-1-4
1-1-5	Semi-Sitting Position	1-1-4
1-1-6	Chin Lift	1-1-9
1-1-7	Breathing	1-1-10
1-1-8	Pulse	1-1-10
1-1-9	Bleeding	1-1-11
1-1-10	Drag	1-1-13
1-1-11	Modified Drag	1-1-13
1-1-12	Rolling Onto a Tarp	1-1-14
1-1-13	Tarp Drag	1-1-15
1-1-14	Packstrap Carry	1-1-16
1-1-15	Pick-a-Back Carry	1-1-17
1-1-16	Carrying Seat With Wide Strap	1-1-18
1-1-17	Fore-and-Aft Lift and Carry	1-1-19
1-1-18	Hand Grip	1-1-19
1-1-19	Two-Person Lift	1-1-20
1-1-20	Two-Person Carry	1-1-20
1-1-21	Layers of Skin	1-1-21
1-1-22	Leg Scrape	1-1-22
1-1-23	Types of Burns	1-1-23
1-1-24	First-Degree Burn	1-1-24
1-1-25	Second-Degree Burn	1-1-25
1-1-26	Third-Degree Burn	1-1-26
1-1-27	Washing the Wound	1-1-28
1-1-28	Dressing and Taping the Wound	1-1-29
1-1-29	Cooling the Burn	1-1-30
1-1-30	Dressing the Burn	1-1-31
1-4-1	Fire Index	1-4-3
1-4-2	Fire Triangle	1-4-3
1-4-3	Firewall	1-4-4
1-4-4	Fire Ring	1-4-5
1-4-5	Firepit	1-4-5
1-4-6	Feather Sticks	1-4-8
1-4-7	Bearing Block	1-4-10
1-4-8	Softwood Base	1-4-11
1-4-9	Drill	1-4-12
1-4-10	Fire Bow and Drill	1-4-12
1-4-11	Fire Plough	1-4-13
1-4-12	Magnesium Fire Block	1-4-14

LIST OF FIGURES (Cont)

FIGURE	TITLE	PAGE
1-4-13	Convex Lens	1-4-15
1-4-14	The Fire Piston	1-4-16
1-5-1	Tree Hollow	1-5-4
1-5-2	Natural Hollow	1-5-5
1-5-3	Bough Shelter	1-5-5
1-5-4	Fallen Trunk	1-5-6
1-5-5	Cave	1-5-6
1-5-6	Root Shelter	1-5-7
1-5-7	Bent Tree Shelter	1-5-7
1-5-8	Lean-To	1-5-8
1-5-9	One-Person Poncho Shelter	1-5-8
1-5-10	Two-Person Poncho Shelter	1-5-9
1-5-11	Groundsheet Shelter	1-5-9
1-5-12	Snow Cave	1-5-10
1-5-13	Teepee	1-5-10
1-5-14	One-Person Poncho Shelter	1-5-12
1-5-15	Two-Person Poncho Shelter	1-5-12
1-5-16	Lean-To	1-5-14
1-5-17	Lean-To With Firewall	1-5-15
1-5-18	Figure-of-Eight Lashing	1-5-18
1-5-19	Add Additional Poles	1-5-19
1-5-20	Attach the Parachute	1-5-20
1-5-21	Cover the Tripod	1-5-21
1-5-22	Tie up the Parachute	1-5-22
1-5-23	Completed Teepee from the Front	1-5-23
1-5-24	Completed Teepee from the Side	1-5-23
1-6-1	A Luminous Cone Fire	1-6-2
1-8-1	Vegetation Bag	1-8-5
1-8-2	Transpiration Bag	1-8-6
1-8-3	A Solar Still	1-8-7
1-8-4	Improvised Distillation Kit	1-8-10
1-9-1	Nutritional Value	1-9-2
1-10-1	Fishing Hooks	1-10-3
1-10-2	Fishing with Multiple Lines	1-10-4
1-10-3	Night Lines	1-10-5
1-10-4	Clinch Knot	1-10-6
1-11-1	A Simple Snare	1-11-3
1-11-2	A Squirrel Trap	1-11-5
1-12-1	Skinning a Small Animal	1-12-2
1-12-2	Filleting a Fish	1-12-4
1-12-3	Grilling	1-12-6
1-12-4	Roasting	1-12-7

LIST OF FIGURES (Cont)

FIGURE	TITLE	PAGE
1-13-1	Cattail	1-13-5
1-13-2	Cambium	1-13-6
1-13-3	Hibiscus	1-13-7
1-13-4	Seaweed	1-13-8
1-15-1	Cloud Formations	1-15-6
1-15-2	Barometer	1-15-8
1-15-3	Air Pressure	1-15-9
1-15-4	Cold Front	1-15-10
1-15-5	Warm Front	1-15-11
1-15-6	Jet Streams	1-15-12
1-15-7	North American Jet Streams	1-15-12
1-15-8	Cloud Weather Signs	1-15-14
1-15-9	Wind Chill Chart	1-15-17
1B-1	Ground-to-Air Signals	1B-1
1C-1	Nutritional Value	1C-1
1D-1	Poison Ivy	1D-1
1D-2	Poison Oak	1D-1
1E-1	Castor Bean	1E-1
1E-2	Death Camas	1E-1
1E-3	Oleander	1E-2
1E-4	Poison Hemlock	1E-2
1F-1	Ladder Bed	1F-1
1G-1	Pack Frame	1G-1
1H-1	Shower	1H-1
1I-1	Washstand	1I-1
1J-1	Drying Rack 1	1J-1
1J-2	Drying Rack 2	1J-2
1K-1	Tool Rack 1	1K-1
1K-2	Tool Rack 2	1K-2
1L-1	Pot Rod	1L-1
1L-2	Swinging Pot Holder	1L-2
1L-3	Chippewa Kitchen	1L-3
1M-1	Wheelbarrow	1M-1
1N-1	Hanger	1N-1
1O-1	Simple Bench	1O-1
1P-1	Bench with Back Rest	1P-1
1Q-1	Camp Table 1	1Q-1
1R-1	Camp Table 2	1R-2
1S-1	Camp Table 3	1S-1
1T-1	Friction Lock Table	1T-2
1U-1	Cirrus Cloud	1U-1
1U-2	Cirrocumulus Cloud	1U-2

LIST OF FIGURES (Cont)

FIGURE	TITLE	PAGE
1U-3	Cirrostratus Clouds	1U-3
1U-4	Altocumulus Cloud	1U-4
1U-5	Altostratus	1U-5
1U-6	Stratus Cloud	1U-6
1U-7	Stratocumulus Cloud	1U-7
1U-8	Nimbostratus Cloud	1U-8
1U-9	Cumulus Cloud	1U-9
1U-10	Towering Cumulus	1U-10
1U-11	Cumulonimbus From Ground	1U-11
1U-12	Cumulonimbus From Sky	1U-12
1V-1	Common Types of Clouds	1V-1
1W-1	Common Descriptions	1W-1
1X-1	Cloud Weather Signs	1X-1
1Y-1	Cloud Weather Signs	1Y-1
2-1-1	Female Black Widow	2-1-4
2-1-2	Brown Recluse Spider	2-1-4
2-1-3	Wasp	2-1-5
2-1-4	Tick	2-1-6
2-3-1	Exercise Site	2-3-4
2-4-1	Frame	2-4-3
2-4-2	Centre Section	2-4-3
2-4-3	Front Wall	2-4-4
2-4-4	Rear Wall	2-4-4
2-4-5	Frame Lock	2-4-7
2-4-6	Canvas Lacing	2-4-7
2-4-7	Canvas Lacing	2-4-8
2-4-8	Erect One Side	2-4-8
2-4-9	Place Canvas	2-4-9
2-4-10	Save Straps	2-4-9
2-4-11	Bracing Cables	2-4-10
2-4-12	Drive in Pegs	2-4-10
2-4-13	10-Person Arctic Tent Parts	2-4-12
2-4-14	5-Person Arctic Tent	2-4-13
2-4-15	5-Person Arctic Tent Sleeping Arrangement	2-4-13
2-4-16	10-Person Arctic Tent	2-4-14
2-4-17	10-Person Arctic Tent Sleeping Arrangement	2-4-14
2-4-18	Three-Season Tent	2-4-18
2-4-19	Four-Season Tent	2-4-18
2-6-1	Step 1	2-6-2
2-6-2	Step 2	2-6-3
2-6-3	Step 3	2-6-3
2-6-4	Step 4	2-6-4

LIST OF FIGURES (Cont)

FIGURE	TITLE	PAGE
2-6-5	Step 5	2-6-4
2-6-6	Step 1	2-6-5
2-6-7	Step 2	2-6-5
2-6-8	Step 3	2-6-6
2-6-9	Step 1	2-6-6
2-6-10	Step 2	2-6-7
2-6-11	Step 3	2-6-7
2-6-12	Step 4	2-6-8
2-6-13	Step 1	2-6-8
2-6-14	Step 2	2-6-9
2-6-15	Step 3	2-6-9
2-6-16	Step 4	2-6-10
2-6-17	Step 1	2-6-11
2-6-18	Step 2	2-6-12
2-6-19	Step 3	2-6-12
2-6-20	Step 4	2-6-13
2-6-21	Step 5	2-6-13
2-6-22	Step 6	2-6-14
2-6-23	Step 7	2-6-14
2-6-24	Step 1	2-6-15
2-6-25	Step 2	2-6-15
2-6-26	Step 3	2-6-16
2-6-27	Step 4	2-6-16
2-6-28	Step 5	2-6-17
2-6-29	Step 6	2-6-17
2-6-30	Step 7	2-6-18
2-6-31	Step 8	2-6-18
2-6-32	Step 1	2-6-19
2-6-33	Step 2	2-6-19
2-6-34	Step 3	2-6-20
2-6-35	Step 4	2-6-20
2-6-36	Step 5	2-6-21
2-6-37	Step 6	2-6-21
2-6-38	Step 7	2-6-22
2-7-1	Felling Axe	2-7-4
2-7-2	Splitting Axe	2-7-5
2-7-3	Broadaxe	2-7-6
2-7-4	Adze	2-7-6
2-7-5	Axe Carrying	2-7-8
2-7-6	Bow Saw	2-7-9
2-7-7	Storing a Bow Saw	2-7-11
2-7-8	Tool Rack	2-7-11

LIST OF FIGURES (Cont)

FIGURE	TITLE	PAGE
2-7-9	A Sharpening Stone	2-7-13
2-7-10	A Sharpening Steel	2-7-13
2-7-11	Sharpening Tool	2-7-14
2-7-12	Axe Sharpening 1	2-7-15
2-7-13	Axe Sharpening 2	2-7-16
2-7-14	Chopping Area	2-7-18
2-7-15	Wedge	2-7-19
2-7-16	Removing Branches 1	2-7-20
2-7-17	Removing Branches 2	2-7-20
2-7-18	Log Chopping 1	2-7-21
2-7-19	Log Chopping 2	2-7-21
2-7-20	Chopping Area	2-7-22
2-7-21	Cutting with a Bow Saw	2-7-23
2-8-1	Parts of the Coleman Two-Burner Stove	2-8-3
2-8-2	Coleman Dual-Mantle Lantern	2-8-5
2-8-3	Closed Stove	2-8-9
2-8-4	Wind Baffles	2-8-10
2-8-5	Installing the Fuel Tank	2-8-10
2-8-6	Securing the Safety Chain	2-8-11
2-8-7	Closed Grate	2-8-11
2-8-8	Auxiliary Burner Control	2-8-11
2-8-9	Pumping the Fuel Tank	2-8-12
2-8-10	Lighting the Main Burner	2-8-13
2-8-11	Replacing a Mantle	2-8-17
2-8-12	Pump Assembly	2-8-18
2-9-1	Hand-Held Radio	2-9-3
2-9-2	Batteries	2-9-4
2-9-3	Changing the Batteries	2-9-4
2B-1	Sample Exercise Site	2B-1
2C-1	Folding a Single Tent Section	2C-1
2C-2	Folding Laced Tent Sections	2C-2
2D-1	Steps 1–5	2D-1
2D-2	Steps 1–3	2D-2
2D-3	Steps 1–4	2D-3
2D-4	Steps 1–4	2D-4
2E-1	Steps 1–3	2E-1
2E-2	Steps 4–7	2E-2
2E-3	Steps 1–4	2E-3
2E-4	Steps 5–8	2E-4
2E-5	Steps 1–3	2E-5
2E-6	Steps 4–7	2E-6
4-1-1	Chinese Floating Compass	4-1-2

LIST OF FIGURES (Cont)

FIGURE	TITLE	PAGE
4-1-2	Earth's Magnetic Field	4-1-3
4-1-3	Cardinal Points	4-1-5
4-1-4	Compass	4-1-7
4-1-5	Three Norths	4-1-9
4-2-1	Shadow Stick	4-2-2
4-2-2	Analog Watch	4-2-4
4-3-1	Moon Phases	4-3-2
4-3-2	Determining South by the Moon	4-3-3
4-3-3	Ursa Major	4-3-5
4-3-4	Cassiopeia	4-3-6
4-3-5	Orion	4-3-7
4-3-6	Orion and North	4-3-8
4-3-7	Ursa Minor	4-3-9
4-3-8	Polaris	4-3-11
4-3-9	Finding Polaris	4-3-12
4-4-1	Blazing Techniques	4-4-4
4-5-1	Determining Distance Using Pacing	4-5-2
4-6-1	Determining a Magnetic Bearing	4-6-3
4A-1	Parts of a Compass	4A-1
4A-2	Parts of a Compass	4A-2
4B-1	Cardinal, Inter-Cardinal and Intermediate Points	4B-1
4B-2	Cardinal, Inter-Cardinal and Intermediate Points	4B-2
4C-1	Finding Polaris	4C-1
4D-1	Sky Map	4D-1
4E-1	Blazing Techniques	4E-1

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CHAPTER 1

PO S291 – PERFORM SURVIVAL SKILLS

ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 1

EO S291.01 – PERFORM MINOR FIRST AID IN A FIELD SETTING

Total Time:	120 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, *Royal Canadian Air Cadets, Basic Survival Training Course, Qualification Standard and Plan*, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

There is no requirement for a qualified first aid instructor to teach the material contained in this lesson, as the cadets are not required to qualify in first aid.

The instructor should be qualified in first aid.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

Demonstration and performance was chosen for TPs 1–3 and 5 as it allows the instructor to explain and demonstrate minor first aid while providing an opportunity for the cadet to practice and develop these skills under supervision.

An interactive lecture was chosen for TP 4 to introduce the cadets to minor wounds and burns while generating interest.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have performed minor first aid in a field setting.

IMPORTANCE

It is important for the cadets to be able to perform some minor first aid skills in survival situations. Having a basic understanding of minor first aid will enable the cadets to take action in an emergency situation.

Teaching Point 1 **Demonstrate and Have the Cadets Perform Minor First Aid**

Time: 25 min Method: Demonstration and Performance

When performing first aid in the field there are certain considerations regardless of what the injury or illness is. The following are the fist things that need to be addressed:

- breathing problems,
- exposure,
- shock, and
- dehydration.

BREATHING PROBLEMS

Many people have died in the wilderness because they were left on their back while someone went to seek assistance. In most cases the person became unconscious and their relaxed tongue fell to the back of their throat blocking the air passage. In some cases the wounded individual vomited and it entered their lungs. In other cases blood from the nose collected and caused asphyxiation.

Placing a casualty in the recovery position is one of the basic parts of first aid. The recovery position protects an unconscious or injured casualty against fluids entering the lungs. If the casualty is on the snow or damp ground, a blanket or pad should be placed underneath them to protect their face and reduce heat loss.

The Recovery Position

The recovery position is adopted as follows:

1. Cross the casualty's legs and ankles, with the leg further from you on top.
2. Place the arm closer to you along their side, the arm further from you across their chest (as illustrated in Figure 1-1-1).

W. Merry, St. John Ambulance: The Official First Aid Guide, McClelland & Stewart Inc. (p. 3)

Figure 1-1-1 Preparing the Roll

3. Support their head with one hand and grip their clothing at the waist on the far side.
4. Roll the person gently toward you, protecting their head and neck, and resting them against your knees (as illustrated in Figure 1-1-2).

W. Merry, St. John Ambulance: The Official First Aid Guide, McClelland & Stewart Inc. (p. 3)

Figure 1-1-2 Making the Roll

5. Bend their upper knee toward you to form a support (as illustrated in Figure 1-1-3).

W. Merry, St. John Ambulance: The Official First Aid Guide, McClelland & Stewart Inc. (p. 3)

Figure 1-1-3 Leg Position

6. Position their head with the chin slightly extended to keep their airway open.
7. Place the upper arm above the head to keep the casualty from rolling onto their face (as illustrated in Figure 1-1-4).
8. Place the lower arm along their back so they cannot roll onto their back.

W. Merry, St. John Ambulance: The Official First Aid Guide, McClelland & Stewart Inc. (p. 3)

Figure 1-1-4 Final Position

If the individual is conscious and having breathing problems it is best to place them in a seated position. Causalities have died because they cannot get enough air into their lungs. A person lying down cannot breathe as well as someone who is sitting up.

W. Merry, St. John Ambulance: The Official First Aid Guide, McClelland & Stewart Inc. (p. 4)

Figure 1-1-5 Semi-Sitting Position

EXPOSURE

Exposure is a common hazard in a survival situation. It occurs when a person's core body temperature falls below 33.7 degrees Celsius. If a person is wet, even in a mild wind, exposure (hypothermia) can occur in temperatures as high as 15 degrees Celsius.

Anyone who is sick or injured is more in danger of the cold than a healthy person. They may get hypothermia or frostbite, because their bodies are unable to produce heat. A first-aider must protect a casualty from exposure even in a warm environment.

Protecting a casualty from the cold is as simple as covering them with a sleeping bag, blanket or extra clothing. It is also necessary to place something underneath the casualty as body heat is easily lost into the ground. Keep the casualty warm and dry as an injured person is extremely sensitive to changes in temperature.

SHOCK

Shock may be present with many injuries or illnesses and is usually present in serious injuries. Shock occurs when there is inadequate organ perfusion (decreased oxygen passing through the organs).

The Circulatory System

The heart is a pump. The veins and arteries work like flexible hoses, carrying blood to and from every part of the body, bringing oxygen and food. The food and oxygen are “burned”, keeping the body healthy and producing heat. When organs are not getting enough oxygen to work properly the signs of shock will begin to show.

Causes of Shock

Shock is caused by a drop in blood pressure. This pressure is provided by the heart and maintained by the veins and arteries. Several things cause this pressure to drop; if there is a “leak” in the system from a bad cut, blood flows out and the pressure drops.

Signs and Symptoms of Shock

Signs and symptoms of shock include:

- pale, cool clammy skin,
- rapid pulse rate,
- rapid breathing,
- thirst,
- gasping for air,
- anxiety,
- nervousness,
- confusion, and
- decreased amounts of urine.

Shock Prevention

Fainting is not the same as shock but is caused by a shortage of blood flow to the brain.

Once shock starts, it may be difficult to stop. Always expect shock in any severe injury or illness and prevent it by:

- ensuring a good airway;
- controlling bleeding;
- lying the casualty down, with their feet raised 8–12 inches (do not tilt the entire body if there is difficulty breathing);
- keeping the casualty warm and comfortable;
- avoiding rough handling;
- reducing pain as much as possible (for example, by splinting fractures); and
- reassuring the casualty.

DEHYDRATION

Dehydration is not usually a factor in urban first aid. In the wilderness; however, it often effects a person more than we think.

Dehydration occurs when the body loses more water than what it takes in. Dehydration is usually caused by:

- not drinking enough water;
- losing too much water through the skin by perspiration;
- losing too much water through the lungs by evaporation;
- losing water through vomiting or diarrhea; and
- frequently urinating.

A person who is working hard outdoors in a survival situation for several days with little opportunity to drink may become severally dehydrated and may show signs similar to shock. With the cold, very dry air in the north, dehydration is rapid.

Signs and Symptoms of Dehydration

Signs and symptoms of dehydration include:

- thirst,
- dry tongue,
- discomfort,
- tiredness,
- nausea,
- sleepiness,
- pale, cool and clammy skin,
- faster pulse,
- pinched skin on back of hand is slow to flatten out, and
- little urine, dark in colour.

A person who drinks an adequate amount of fluids and is healthy will produce at least 1000 ml of urine in 24 hours.

Prevention of Dehydration

Drink more water during outdoor activities. Try to drink even if there is no feeling of thirst. Remember that drinks containing caffeine are diuretics and will make one urinate more often. Although one can reduce thirst for a short time by nibbling on snow, remember that melting any amount of snow in the mouth takes an enormous amount of heat from the body and produces little water. Any water one can get, no matter how icy will use up less body heat and be more thirst quenching.

There are stories of people who have survived for long periods of time by drinking their own urine, but it is more likely that they survived in spite of drinking urine since urine and sea water contain large amounts of salt which draw water away from the tissues, having an overall negative effect on hydration.

ACTIVITY

Time: 10 min

OBJECTIVE

The objective of this activity is to have the cadets practice putting a casualty in the recovery position.

RESOURCES

N/A.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

1. Divide the cadets in groups of three or four.
2. Have one cadet act as the casualty, one act as the first-aider and one or two observe and assist.
3. The first-aider will put the casualty in the recovery position by:
    a. crossing the casualty's legs and ankles, with the leg further from you on top;
    b. placing the arm closer to you along their side, the arm further from you across their chest;
    c. supporting their head with one hand and grip their clothing at the waist on the far side;
    d. rolling the person gently toward you, protecting their head and neck, and resting them against the knees;
    e. bending their upper knee toward you to form a support;
    f. positioning their head with the chin slightly extended to keep their airway open;
    g. placing their upper arm to keep the casualty from rolling onto their face; and
    h. placing the lower arm along their back so they cannot roll onto their back.
4. Have the cadets rotate through positions as time allows.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in putting a casualty into the recovery position will serve as the confirmation of this TP.

Teaching Point 2 **Demonstrate and Have the Cadets Practice Actions to Take at an Emergency Scene**

Time: 30 min Method: Demonstration and Performance

For this skill lesson, it is recommended that the instructor take the following format:

1. Explain and demonstrate the step in the Priority Action Approach while cadets observe.
2. Explain and demonstrate each step required to complete the skill. Monitor cadets as they imitate each step.
3. Monitor the cadets' performance as they practice the complete skill.

Note: Assistant instructors may be used to monitor the cadets performance.

Have the cadets follow along in groups of two.

ENSURE PERSONAL SAFETY

With serious injuries it is often difficult to know how to assist. Most people react well to less serious problems. When a person gets a cut or a scrape or even breaks an arm, it is easy to see and understand what is wrong and handle it without great emotion or confusion.

In every first aid situation, before doing anything else, you must make sure there is no further hazard threatening oneself or the casualty. Take care of the hazard first or get the casualty away from it.

Rescuer panic usually happens when the casualty is unconscious or dazed, when there is a lot of blood or disfigurement or when we do not know what is exactly wrong with the casualty but suspect it is quite serious. If the exact cause is known there is no need to go through a Priority Action Approach, but in certain cases it is necessary to follow a checklist of tasks to perform.

FOLLOW THE STEPS IN A PRIORITY ACTION APPROCAH

First aid requires the Priority Action Approach. This means that most life threatening things are cared for first and then the less critical areas are taken care of next.

The most common approach uses the first four letters of the alphabet as clues:

A = Airway and cervical spine

B = Breathing

C = Circulation and bleeding

D = Deadly bleeds

Also, include "S" for shock, because it may be present in any serious injury or illness.

Check the level of consciousness (LOC), by talking to the casualty in a loud voice. If the casualty is unresponsive immediately begin the Priority Action Approach.

(A) Airway and Cervical Spine. Check the airway. Is it open? Is there anything blocking the airway (eg, packed snow or blood)? Clear it. Is the tongue falling back blocking the airway? To open the airway, move the lower jaw upward without moving the neck.

W. Merry, St. John Ambulance: The Official First Aid Guide, McClelland & Stewart Inc. (p. 15)

Figure 1-1-6 Chin Lift

If there is a possibility of neck injury, immobilize the neck with a cervical or improvised collar.

(B) Breathing. Be sure the casualty is breathing. Remember, they can only live for minutes without air. Press an ear next to their lips. Listen for breathing, feel for their breath on the ear or cheek, and watch for the chest to rise and fall. If the casualty is not breathing, start rescue breathing immediately.

Rescue Breathing

With the chin lifted as illustrated in Figure 1-1-6, place the mouth over the casualty's mouth and establish a seal. Close the nostrils then breathe into the casualty's mouth and then lift the mouth away, permitting the victim to exhale. The rescuer breathes 12 times each minute (15 times for a child and 20 for an infant) into the casualty's mouth.

Rescue breathing and CPR (cardiopulmonary resuscitation) are very different in purpose. Rescue breathing only addresses the casualty's breathing problems. CPR addresses both breathing and circulatory problems. CPR requires extensive practice and will not be covered in this lesson.

W. Merry, St. John Ambulance: The Official First Aid Guide, McClelland & Stewart Inc. (p. 15)

Figure 1-1-7 Breathing

(C) Circulation. Check the circulation. Do they have a pulse? The pulse in their neck (carotid pulse) is the easiest to check, because it is strongest. Fingers can be slipped onto the neck without removing clothing and risking frostbite. If there is no pulse and you have CPR training, start CPR.

Breathing and circulation go hand in hand and a casualty cannot survive without either. If there is no pulse, chances are unlikely that the casualty will be breathing but they can still have a heartbeat and not be breathing if the injuries were recent. Start rescue breathing in this situation.

W. Merry, St. John Ambulance: The Official First Aid Guide, McClelland & Stewart Inc. (p. 16)

Figure 1-1-8 Pulse

(D) Deadly Bleeds. Make sure that the casualty is not bleeding severely from somewhere unseen. While wearing latex or surgical gloves, slide a hand gently beneath the casualty then remove and look for blood on the gloves. If the casualty is bleeding severely, try to stop it. Next, feel carefully underneath the casualty for any obvious bumps, irregularities or tenderness in the spine indicating damage.

W. Merry, St. John Ambulance: The Official First Aid Guide, McClelland & Stewart Inc. (p. 16)

Figure 1-1-9 Bleeding

(S) Shock. Shock is a life-threatening disability. If the casualty shows or is likely to show the signs of shock, begin treatment immediately.

Shock is covered in TP1; there is no need to repeat the information here.

The complete check should only take a couple of minutes.

First-aiders should wear latex gloves whenever they may be exposed to bodily fluids, because of the increasing danger of HIV (the AIDS virus), hepatitis B and other diseases. Every first aid kit should include one or more pairs of gloves. They can be obtained at a drug store, nursing station or hospital. After use, the contaminated gloves should be carefully removed and burned. Any blood that accidentally spatters onto skin must be washed immediately with soap and water.

CONFIRMATION OF TEACHING POINT 2

The cadets' participation in completing the Priority Action Approach will serve as the confirmation of this TP.

Teaching Point 3 **Demonstrate and Have the Cadets Move a Casualty to Shelter**

Time: 30 min Method: Demonstration and Performance

For this skill lesson, it is recommended that the instructor take the following format:

1. Explain and demonstrate each carry while the cadets observe.
2. Explain and demonstrate each step required to complete the skill. Monitor the cadets as they imitate each step in groups of two or three.
3. Monitor the cadets' performance as they practice the complete skill.

Note: Assistant instructors may be used to assist with carries and monitor the cadets' performance.

MOVES AND CARRIES OVER SHORT DISTANCES

Most wilderness emergencies require moving or carrying a casualty a short distance, with usually only one or two rescuers. It is difficult to carry an adult for any distance and it is easy to injure them further while carrying.

Drags

A casualty should be dragged only if they must be moved quickly out of danger, severe cold, strong winds, blowing snow or water. It is important to assess the casualty before attempting a drag because some injuries, if not yet stabilized, may be aggravated by premature movement. If there is only one rescuer, dragging may be the only means of moving a casualty.

When dragging a casualty, observe the following rules:

- Drag a casualty headfirst. This allows the head and neck to be supported and keeps the body straight.
- Keep the body in-line. The casualty's body must not twist or bend. Avoid major bumps.
- The neck should not bend sharply, nor should the head fall forward or to the side.

Steps to drag a person:

1. If possible, secure the casualty's hands before beginning the drag.
2. Reach under the casualty's body and grip their clothing just below their shoulder on either side while supporting the head and neck using the forearms.
3. Crouch or kneel and walk backwards (as illustrated in Figure 1-1-10).
4. Stop when the casualty is out of danger.

This drag is hard on the rescuer's back, so be careful.

W. Merry, St. John Ambulance: The Official First Aid Guide, McClelland & Stewart Inc. (p. 21)

Figure 1-1-10 Drag

5. If the casualty's clothing pulls up too much or tears, place a shirt or jacket over their chest and bring the sleeves under their back to provide a firm grip (as illustrated in Figure 1-1-11).

You can use cuff buttons or Velcro, mitten ties or a piece of cord to assist in this drag.

W. Merry, St. John Ambulance: The Official First Aid Guide, McClelland & Stewart Inc. (p. 21)

Figure 1-1-11 Modified Drag

Tarp-Drag Method

Rarely should lifts or carries be done on snow for the possibility of the rescuer slipping; it is safer and easier to drag a casualty on a tarp or sled.

The tarp-drag method works well on snow. A rescuer may make a ramp of snow and slide a casualty onto a sled. This drag is also a good way to move a casualty onto insulating material to protect them from cold ground or snow.

One may wish to leave the tarp under the casualty to aid in another lift. Always put the casualty into a basket stretcher with a backboard, blanket or tarp under them, as it is otherwise difficult to remove them without excessive movement.

Be careful when using the tarp-drag method on sloping snow as control may be lost on a downhill slope.

Dragging a casualty on a tarp, blanket, sail, tent or large hide can be accomplished by following these steps:

1. Place the tarp next to the casualty.
2. Fold the tarp into accordion folds of about one metre (three feet) wide.
3. Log-roll the casualty toward you and brace them there with your knees while you use one hand to slide the folds close against their back.
4. Roll the casualty gently back onto the accordion folds.
5. Reach under the casualty and pull the folds out straight.

W. Merry, St. John Ambulance: The Official First Aid Guide, McClelland & Stewart Inc. (p. 21)

Figure 1-1-12 Rolling Onto a Tarp

6. Grip the tarp and hold the casualty's head and shoulders off the ground and drag carefully.

W. Merry, St. John Ambulance: The Official First Aid Guide, McClelland & Stewart Inc. (p. 21)

Figure 1-1-13 Tarp Drag

Single-Rescue Carries

Most single-rescuer carries are for short distances and cannot be used to transport a casualty with major injuries. All are extremely strenuous. They are often used to transport casualties with injuries of the lower extremities but care must be taken as it is easy to cause further injuries.

Packstrap Carry

This is a quick, easy carry for very short distances. The casualty must be able to stand to get into position with their arms across the shoulders like packstraps. Bring the casualties arms across the shoulders, crossing their

wrists in front. Hold their wrists while bending forward and lift the casualty's feet off the ground. Be sure their arms are bent at the elbow.

W. Merry, St. John Ambulance: The Official First Aid Guide, McClelland & Stewart Inc. (p. 23)

Figure 1-1-14 Packstrap Carry

Pick-a-Back Carry

This familiar carry is good for short-distance transport of conscious casualties with minor injuries and may be used to carry children for long distances.

W. Merry, St. John Ambulance: The Official First Aid Guide, McClelland & Stewart Inc. (p. 23)

Figure 1-1-15 Pick-a-Back Carry

Carrying Seat

A quick and easy backpack seat to assist the pick-a-back system may be made with a simple loop of wide strap. It may be necessary to adjust the length once or twice for maximum comfort. This seat is best used if the casualty is lighter than the rescuer, otherwise it may put painful pressure on the rescuer's neck and shoulders.

W. Merry, St. John Ambulance: The Official First Aid Guide, McClelland & Stewart Inc. (p. 23)

Figure 1-1-16 Carrying Seat With Wide Strap

TWO-PERSON CARRIES

Lifting is half as strenuous if there are two rescuers; however carrying for any distance is usually not easier because two carriers must compensate for each other's movements to keep balanced. The chance of error is multiplied with each added person in a lifting team and injury to the casualty often occurs if lifts are poor. Whenever more than one person lifts, observe the following rules:

- One person must be clearly designated as the leader and be responsible for giving all of the commands.
- The partner(s) must be told exactly what is to be done and what the commands will be.
- The lift should first be practiced without the casualty or on an uninjured person.
- Rescuers should maintain eye contact while lifting.

The Fore-and-Aft Lift and Carry

This should be used only if the casualty has minor injuries. On uneven terrain, it may be the easiest method of lifting a casualty onto a stretcher or another means of transport. As it produces some pressure against the chest, it will restrict the casualty's air flow. Follow these steps:

1. If the casualty is conscious, help them sit up. If the casualty is unconscious, have a partner take the casualty's hands and pull them into the sitting position.
2. Cross the casualty's arms on their chest.
3. Crouch behind them, reach under their arms and grasp the opposite wrists.
4. Have your partner crouch at the casualty's knees, facing their feet and take a leg under each arm.
5. At the leader's signal, rise, keeping your back straight.

W. Merry, St. John Ambulance: The Official First Aid Guide, McClelland & Stewart Inc. (p. 26)

Figure 1-1-17 Fore-and-Aft Lift and Carry

Two-Hand Seat

This two-person lift and carry is good for casualties who cannot hold onto the rescuer's shoulders for support, or who are not fully alert.

1. Rescuers crouch on either side of the casualty.
2. Each rescuer will slide one hand under the casualty's thighs and lock fingers over a pad or while wearing mittens or gloves so that fingernails do not dig into each other (as illustrated in Figure 1-1-18).

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Figure 1-1-18 Hand Grip

3. Reach across the casualty's back and grip their belt and pants at the opposite hip; the rescuers' arms are crossed (as illustrated in Figure 1-1-19).
4. Rise on command and step off with the inside foot. This supports the casualty's back; however, the fingers of the gripping hands will tire quickly.

W. Merry, St. John Ambulance: The Official First Aid Guide, McClelland & Stewart Inc. (p. 26)

Figure 1-1-19 Two-Person Lift

For longer carries, try gripping your partner's wrists rather than their fingers. If you are wearing mittens, gripping the wrist will be more secure than gripping the hand. If the casualty is unconscious, they may be lifted easily to a sitting position. One rescuer pulls on the casualty's hands while the other lifts and supports their head; then the rescuers move into position while supporting the casualty's head and back.

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Figure 1-1-20 Two-Person Carry

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in completing all the carries will serve as the confirmation of this TP.

Teaching Point 4 **Have the Cadets Identify Minor Wounds and Types of Burns**

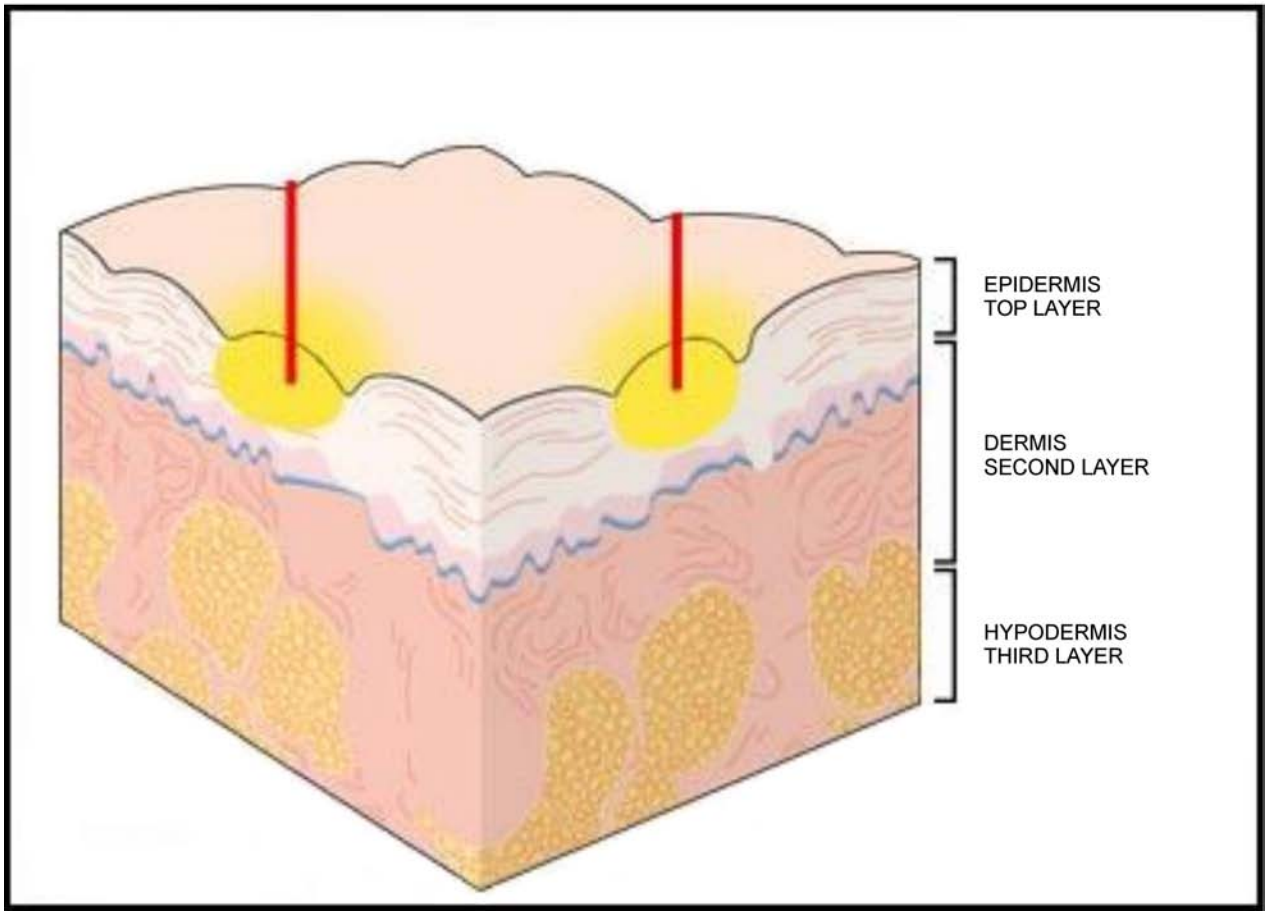
Time: 10 min Method: Interactive Lecture

MINOR WOUNDS

Minor wounds are those that do not have severe bleeding; bleeding wounds can be internal (inside the body) or external (outside the body). Common external bleeding wounds are:

- abrasions and scrapes, and
- nicks and cuts.

There is always a risk of infection when the skin's top layer is broken. Knowing how to identify and treat minor wounds can reduce the risk of infection or aggravation.



Irishhealth.com, Copyright 2007 by Irishhealth.com. Retrieved March 17, 2007, from http://irishhealth.com/indez.html?level=4&con=467

Figure 1-1-21 Layers of Skin

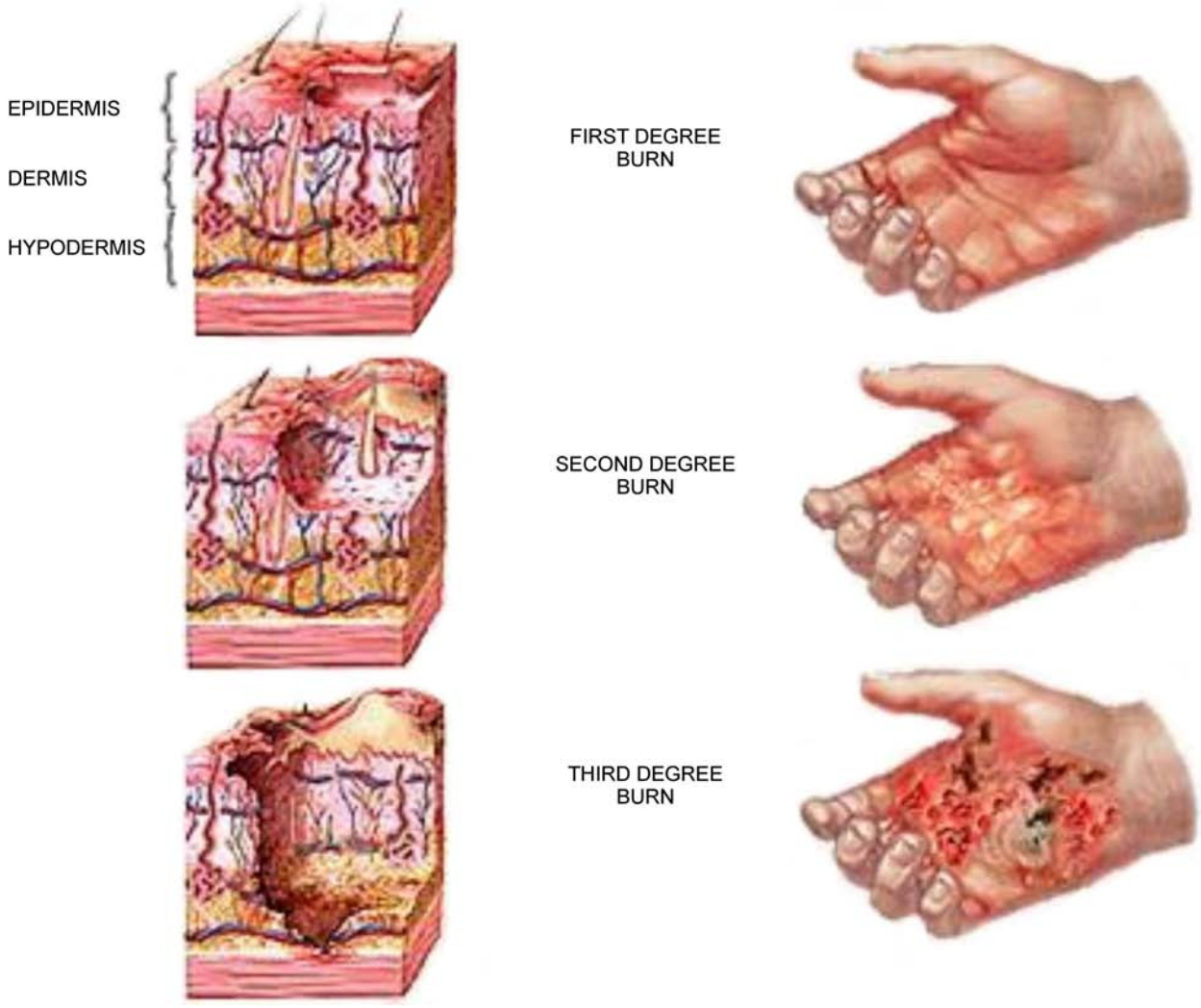
Abrasions and Scrapes. Occur on the top layer of the skin, when the skin is scraped or rubbed away. They and are often painful and may bleed in small amounts.

Nicks and Cuts. Cuts are breaks in the top or second layer of the skin; there is often minor bleeding involved.

TheFatManWalking.com, Copyright 2006 by FatManWalking.com. Retrieved March 6, 2007, from http://www.thefatmanwalking.com/page/65492/\;jsessionid=mni5xlvqdm9

Figure 1-1-22 Leg Scrape

TYPES OF BURNS



Medline Plus, Medical Encyclopedia, Copyright 2007 by US National Library of Medicine. Retrieved March 19, 2007, from http://www.nlm.nih.gov/medecineplus/ency/presentations/100208_4.htm

Figure 1-1-23 Types of Burns

First-Degree Burns. Called superficial burns and only affect the top layer of skin. Hot liquids, heat, and the sun are the main causes of these burns.

Signs and symptoms of a first-degree burn include:

- pinkish-reddish skin;
- slight swelling of the area;
- mild to moderate pain in the area; and
- sore, dry skin.

Trip Report-World Championship in Japan. Retrieved March 17, 2007, from http://homepages.paradise.net.nz/mischief/cp_japan_trip_report.html

Figure 1-1-24 First-Degree Burn

Sunburns are first-degree burns.

Second-Degree Burns. Affect the second layer of skin. Hot liquids, the sun, chemicals, and fire are the main causes of these burns.

Signs and symptoms of a second-degree burn include:

- raw-looking, moist skin;
- skin colouring that may range from white to cherry red;
- blisters containing clear fluid; and
- extreme pain in the area.

Sickkids.ca. Copyright 1999 by The Hospital for Sick Children. Retrieved March 6, 2007, from http:// www.sickkids.ca/plasticsurgery/section.asp?s=Burns&sID=4489&ss=About+Burns&ssID=4496

Figure 1-1-25 Second-Degree Burn

Third-Degree Burns. Affect the third layer of skin and can extend into the muscle. Contact with extreme heat sources (eg, hot liquids and solids, direct flame, chemicals) and electricity are the main causes of these burns.

Signs and symptoms of a third-degree burn include:

- dry, leathery skin;
- pearly white, tan, grey, or charred black skin;
- blood vessels or bone may be visible;
- little or no pain (nerves are destroyed);
- breathing problems; and
- shock.

Sickkids.ca. Copyright 1999 by The Hospital for Sick Children. Retrieved March 6, 2007, from http:// www.sickkids.ca/plasticsurgery/section.asp?s=Burns&sID=4489&ss=About+Burns&ssID=4496

Figure 1-1-26 Third-Degree Burn

CONFIRMATION OF TEACHING POINT 4

QUESTIONS

Q1. Where do abrasions and scrapes occur?

Q2. What layer of the skin does first-degree burn affect and what are the main causes?

Q3. What are the main causes of third-degree burns?

ANTICIPATED ANSWERS

A1. They occur on the top layer of the skin, when the skin is scraped or rubbed away. They and are often painful and may bleed in small amounts.

A2. Called superficial burns and only affect the top layer of skin. Hot liquids, heat and the sun are the main causes of these burns.

A3. Contact with extreme heat sources (eg, hot liquids and solids, direct flame, chemicals) and electricity are the main causes of these burns.

Teaching Point 5 **Demonstrate and Have the Cadets Treat Minor Wounds and First-Degree Burns**

Time: 15 min Method: Demonstration and Performance

For this skill lesson, it is recommended that the instructor take the following format:

1. Explain and demonstrate treating minor wounds and burns while the cadets observe.
2. Explain and demonstrate each step required to complete the skill. Monitor the cadets as they imitate each step.
3. Monitor the cadets' performance as they practice the complete skill.

Note: Assistant instructors may be used to assist with carries and monitor the cadets' performance.

Have the cadets follow along in groups of two.

TREATMENT FOR MINOR WOUNDS

There are three basic objectives when treating abrasions, scrapes, nicks and cuts:

- to control bleeding;
- to prevent further injury; and
- to reduce the risk of infection.

Have cadets, in groups of two, practice the principles of cleaning and treating a wound, using the following resources:

- Gauze,
- Gloves,
- Scissors,
- Sterile dressing, and
- Tape.

Principles to clean and treat a minor wound, to avoid infection:

1. Wash hands with soap and water and put gloves on. Do not cough or breathe directly over the wound.
2. Fully expose the wound, without touching it.
3. Gently wash loose material from the surface of the wound. Wash and dry the surrounding skin with clean dressings, cleaning the wound with clean gauze wiping from the centre of the wound to the edge of the wound. (An antibiotic cream can be used on surface wounds and abrasions).

4. Cover the wound promptly with a sterile dressing.

Medline Plus, Medical Encyclopedia, Copyright 2007 by US National Library of Medicine. Retrieved March 19, 2007, from http://www.nlm.nih.gov/medecineplus/ency/presentations/100208_4.htm

Figure 1-1-27 Washing the Wound

5. Tape the dressing in place.

6. Remove and dispose of the gloves and wash your hands and any other skin area that may have been in contact with the casualty's blood.

Medline Plus, Medical Encyclopedia, Copyright 2007 by US National Library of Medicine. Retrieved March 19, 2007, from http://www.nlm.nih.gov/medecineplus/ency/presentations/100208_4.htm

Figure 1-1-28 Dressing and Taping the Wound

TREATMENT FOR FIRST-DEGREE BURNS

Have cadets, in pairs, practice the principles of cleaning and treating heat and radiation burns, using the following resources:

- Gauze,
- Gloves,
- Scissors,
- Sterile dressing, and
- Tape.

Heat Burns. The most common types of burns; caused by sources of heat such as flames from stoves, lanterns, and fires. A scald is a heat burn caused by hot liquid or steam.

To treat a heat burn:

1. Immerse the burn in cool water until the pain is reduced. If it is not possible to immerse the burn in cool water, flush the burn with cool water and cover it with a clean, wet cloth.

Medline Plus, Medical Encyclopedia, Copyright 2007 by US National Library of Medicine. Retrieved March 19, 2007, from http://www.nlm.nih.gov/medecineplus/ency/presentations/100213_1.htm

Figure 1-1-29 Cooling the Burn

2. Cover the burn with a clean, lint-free dressing.
3. Seek further medical attention, if necessary.

Medline Plus, Medical Encyclopedia, Copyright 2007 by US National Library of Medicine. Retrieved March 19, 2007, from http://www.nlm.nih.gov/medecineplus/ency/presentations/100213_1.htm

Figure 1-1-30 Dressing the Burn

Radiation Burns (Sunburns). Caused by over-exposure to sunlight and can be prevented by wearing sunscreen of a high sun protection factor (SPF), long sleeves, and wide-brimmed hats. Sunburns range from mild to serious.

SPF indicates the time a person using sunscreen can be exposed to sunlight before getting sun-burnt. For example, a person who would normally burn after 12 minutes in the sun would expect to burn after 120 minutes if protected by a sunscreen with SPF 10.

The higher the SPF, the more protection a sunscreen offers against ultraviolet radiation (UV).

To treat radiation burns:

1. Seek shade.
2. Gently sponge the area with cool water.
3. Cover the area with a cool wet towel.
4. Repeat as needed to relieve pain.
5. Pat the skin dry.
6. Apply medicated sunburn lotion (ointment).
7. Seek medical attention, if necessary.

Blisters caused by sunburns should not be broken.

Fevers and vomiting indicate a serious sunburn and medical attention should be sought immediately.

CONFIRMATION OF TEACHING POINT 5

The cadets' participation in treating minor wounds and first-degree burns will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in placing a casualty in the recovery position, practicing the Priority Action Approach, moving a casualty to shelter and treating minor wounds and first-degree burns will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

It is important for the cadets to be able to perform some minor first aid skills in survival situations. Having a basic understanding of minor first aid will enable the cadets to take action in an emergency situation.

INSTRUCTOR NOTES/REMARKS

EO S297.01 (Act as a Member of a Ground Search and Rescue (SAR) Party, Chapter 3, Section 1), will contribute to the practical application of first aid during a search and rescue exercise.

There is no requirement for a qualified first aid instructor to teach the material contained in this lesson, as the cadets are not required to qualify in first aid.

The instructor should be a qualified first-aider.

REFERENCES

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C3-003 (ISBN 1-896713-00-9) Tawrell, P. (1996). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Paul Tawrell.

ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 2

EO S291.02 – PARTICIPATE IN A SURVIVAL PSYCHOLOGY ACTIVITY

Total Time:	80 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

The lesson has been written so a discussion immediately follows the concrete experience. The lesson may be divided into a night activity followed by the discussion the next morning (all of Stage 1, followed by Stages 2–4), but this will affect how the cadets recall the experience as the emotions from the previous night will be greatly lessened after a night's sleep and during the day.

The activity will require a large number of supervisors based on the number of cadets participating. Mark the area selected for the concrete experience with Glow Sticks and flagging tape. Glow Sticks should not be activated until just prior to the lesson.

This lesson relies greatly on the cadets' responses during the group discussions. Note the cadets' responses during the lesson,. Responses that relate to the main points should be used during the conclusion to make the experiential learning more effective.

Photocopy the Main Teaching Points Review Worksheet located at Annex A, to keep track of the cadets' responses.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An experiential learning approach was chosen for this lesson as it allows the cadets to acquire new knowledge through direct experience. The cadets experience the emotions that occur when a person is alone in the wilderness at night simulating a survival situation in a safe, controlled environment. The cadets will be given the opportunity to reflect on and examine what was seen, felt, and thought while they were having the experience, and consider how this relates to what has been already learned and how it relates to future experiences.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have planned for future survival situations through applying their knowledge and experience of a similar situation.

IMPORTANCE

It is important for cadets to learn from their past experiences and knowledge to be better prepared for the future. In a survival situation, one important factor in succeeding is the will to survive.

BACKGROUND KNOWLEDGE

In Proficiency Level 1, the cadets were introduced to survival psychology during EO M190.04 (Discuss Survival Psychology, A-CR-CCP-801/PF-001, *Royal Canadian Air Cadets, Proficiency Level One – Instructional Guides*, Chapter 15, Section 4) through a discussion of:

- the role of fear and how to deal with it. Fear is a normal reaction when in a survival situation. Fear can aid or hinder individuals depending on their reaction to it. Fear is dealt with through having confidence in a leader, if in a group, or in one's self, if alone, having confidence in one's equipment, and concentrating on the job to be done;
- the actions to take when lost, which are stop, think, observe and plan (STOP);
- the survival pattern: first aid, shelter, signals, fire, food and water; and
- the seven enemies of survival, which are pain, cold, thirst, hunger, fatigue, boredom, and loneliness.

This information will be referenced through questions in the group discussion in Stage 3 to allow the cadets to make connections between this knowledge and their experience to better plan for future experiences in Stage 4.

ACTIVITY

Time: 20 min Method: Experiential Learning

STAGE 1: CONCRETE EXPERIENCE: The cadets have an experience and take time to identify and define what the experience was.

OBJECTIVE

The objective of this activity is to have the cadets experience being in the wilderness alone, and at night.

RESOURCES

- Presentation aids (eg, whiteboard/flip chart/OHP) appropriate for the training area,
- Whistle (one per cadet),

- Flashlight (one per cadet),
- Flagging tape,
- Glow Sticks,
- Batteries, and
- Hand-Held radios (one per supervisor).

ACTIVITY LAYOUT

N/A.

SAFETY

The cadets will be advised that if they start to feel uncomfortable, anxious or panicky that they are to signal the staff (use a whistle, three short blasts) who will then come to them. Advise the cadets to remain at their location.

INSTRUCTOR GUIDELINES

The area shall be set up prior to the arrival of the cadets. The cadets should be given time right after being woken to use the bathrooms before giving them the instructions for the night's activity. It is recommended that the area being used is on a road/trail/cut-line to allow easy movement to and from the area while also allowing a rapid response in case of an emergency. Cadets should be placed a minimum of 20 m apart and approximately 10 m into the bush. Entry points from the road/trail/cut-line should be identified with a Glow Stick and the route from the Glow Stick to the cadets' place marked with flagging tape. Activity by the staff (movement, use of radios, use of flashlights, talking, etc) should be kept to an absolute minimum during the quiet time as to not interfere with the purpose of the activity.

The cadets will be woken during the night while on field training and given instructions for the night's activity:

1. The cadets are not to take their watches (or any timekeeping devices) with them.
2. Staff members will place the cadets in the bush.
3. The cadets are to stay quietly where they are placed until a staff member retrieves them.
4. The cadets will be advised that if they start to feel uncomfortable, anxious or panicky that they are to signal the staff (use a whistle, three short blasts) who will then come to them. Advise the cadets to remain at their location.
5. The cadets, while alone in the bush, will be asked to think about their thoughts and feelings/emotions they are experiencing.
6. Inform the cadets that after the activity they will be given the opportunity to describe their experience through a group discussion.
7. After all the instructions have been confirmed with the cadets, they will be escorted into the area of bush already prepared, where they will be alone for a period of approximately 15 minutes.
8. After the allotted time is completed, retrieve the cadets and return to the flight's classroom/group instruction area and begin the group discussion.

The most important detail of this stage is that the cadets experience being alone in the bush at night so they may share their thoughts and feelings/emotions for Stage 2. However, before reflecting on the experience, it must be identified and defined.

Inform the cadets that before they can reflect on their experience, they must be able to identify and define what they did. Begin the discussion by having the cadets describe what happened.

GROUP DISCUSSION

TIPS FOR ANSWERING/FACILITATING DISCUSSION:

- Establish ground rules for discussion, eg, everyone should listen respectfully; don't interrupt; only one person speaks at a time; no one's ideas should be made fun of; you can disagree with ideas but not with the person; try to understand others as much as you hope they understand you; etc.
- Sit the group in a circle, making sure all cadets can be seen by everyone else.
- Ask questions that will provoke thought; in other words avoid questions with yes or no answers.
- Manage time by ensuring the cadets stay on topic.
- Listen and respond in a way that indicates you have heard and understood the cadet. This can be done by paraphrasing their ideas.
- Give the cadets time to respond to your questions.
- Ensure every cadet has an opportunity to participate. One option is to go around the group and have each cadet answer the question with a short answer. Cadets must also have the option to pass if they wish.
- Additional questions should be prepared ahead of time.

The cadets must identify and define at this point, not reflect on the experience. Keep the discussion on this topic only and inform the cadets they will share their experiences in the next discussion.

All responses should be written on the whiteboard/flip chart by an assistant instructor.

Responses that will be used to support the TP during the review should be noted on the Main Teaching Points Review Worksheet at Annex A.

SUGGESTED QUESTIONS

Q1. What happened?

Q2. What did you do?

Q3. What did you notice?

Possible responses to suggested questions:

R1. They were alone; they were in the bush; it was dark; reacted emotionally.

R2. Large variety of responses (thought about situation; sat still; laid down; looked around; slept).

R3. Large variety of responses (warm/cold, wet/dry, stars, moon, clouds, windy, trees, grass).

Other questions and answers will develop throughout the group discussion. The discussion should not be limited to only those questions suggested. However, the discussion should stay on the main topic and not become sidetracked by unrelated issues.

If the main points do not develop from the discussion ensure they are covered before proceeding to the next stage.

Review the main points brought up by the cadets before beginning Stage 2.

REFLECTION

Time: 25 min

STAGE 2: REFLECTIVE OBSERVATION: The cadets reflect upon and examine what they saw, felt and thought while they were having the experience.

Begin by giving the cadets a moment to reflect on their identified and defined experience.

GROUP DISCUSSION

Using the tips for answering/facilitating discussion, conduct the next group discussion giving the cadets the opportunity to share their experiences and opinions.

All responses should be written on the whiteboard/flip chart by an assistant instructor.

Responses that will be used to support the TP during the review should be noted on the Main Teaching Points Review Worksheet at Annex A.

SUGGESTED QUESTIONS

Q1. What did you feel?

Q2. What did you observe?

Q3. How did you react?

Q4. Was fear a factor?

Possible responses to suggested questions:

R1. Stress, anxiety, panic, calm, relaxed.

R2. Large variety of responses.

R3. Personal accounts will vary (eg, thought “happy thoughts”, relived past stressful situations, forced self to be calm, enjoyed seeing the stars).

R4. For most, to a lesser or greater degree, yes.

Other questions and answers will develop throughout the reflection stage. The discussion should not be limited to only those questions suggested. However, the discussion should stay on the main topic and not become sidetracked by unrelated issues.

If the main points do not develop from the discussion ensure they are covered before proceeding to the next stage.

Review the main points brought up by the cadets before beginning Stage 3.

MAKING CONNECTIONS

Time: 15 min

STAGE 3: ABSTRACT CONCEPTUALIZATION: Cadets work to understand and make connections from the experience to new or different situations.

GROUP DISCUSSION

Using the tips for answering/facilitating discussion, conduct the next group discussion giving the cadets the opportunity to share their experiences and opinions.

All responses should be written on the whiteboard/flip chart by an assistant instructor.

Responses that will be used to support the TP during the review should be noted on the Main Teaching Points Review Worksheet at Annex A.

SUGGESTED QUESTIONS

Q1. Was the experience good or bad? Why?

Q2. What did you find most interesting about the experience?

Q3. How is it similar to other experiences you may have had?

Q4. You were alone for this activity. How would being with at least one other person have affected what you experienced?

Q5. Did previous survival lessons/experiences help you deal with the activity? How?

Questions 6–9 are used to make connections with their survival psychology lesson, EO M190.04 (Discuss Survival Psychology, A-CR-CCP-801/PF-001, Chapter 15, Section 4) from Proficiency Level 1.

Q6. For those of you who were scared, how do you think fear would affect your ability to survive?

Q7. Why is STOP so important in a survival situation?

Q8. Why are the priorities in the survival pattern so important in a survival situation?

Q9. Why do you need to combat the seven enemies of survival?

Possible responses to suggested questions:

R1. Either good or bad, and for most it was stressful.

R2. Large variety of responses (eg, never been alone in bush at night, never seen so many stars).

R3. Personal accounts will vary (eg, many past experiences will have either been cadet related or during a family activity).

R4. Have someone to talk with to pass the time, not as scared, relieved not alone.

R5. Many will not remember the past lesson, few will have even related the PL 1 lesson to this experience, and some will relate it to a past experience.

R6. It can aid or hinder a person's will to survive.

R7. Allows the cadet to overcome feelings of panic and gain control of self and situation.

R8. Allows the cadet to create priorities with the most important needs first (based on situation).

R9. Allows the cadet to combat the feelings that reduce the will to survive.

Other questions and answers will develop throughout the group discussion. The discussion should not be limited to only those questions suggested. However, the discussion should stay on the main topic and not become sidetracked by unrelated issues.

If the main points do not develop from the discussion ensure they are covered before proceeding to the next stage.

Review the main points brought up by the cadets before beginning Stage 4.

PLANNING AHEAD

Time: 10 min

STAGE 4: ACTIVE EXPERIMENTATION: Cadets look ahead to, and plan for, the application of skills and knowledge acquired to future experiences.

GROUP DISCUSSION

Using the tips for answering/facilitating discussion, conduct the next group discussion giving the cadets the opportunity to share their experiences and opinions.

All responses should be written on the whiteboard/flip chart by an assistant instructor.

Responses that will be used to support the TP during the review should be noted on the Main Teaching Points Review Worksheet at Annex A.

SUGGESTED QUESTIONS

Q1. Where and how can you use this information in survival psychology on this course?

Q2. Knowing what you now know about survival psychology, how would you change your actions from this last situation (being in the bush, alone, and at night)?

Q3. Describe a future survival situation in which you could find yourself. What can you do now that can help you in that situation?

Possible responses to suggested questions:

R1. Their upcoming survival exercise. By understanding the importance of the will to survive, the cadet may be better able to overcome the stress of being in a survival situation.

R2. Large variety of responses, best is using STOP to take control of self and the situation.

R3. Large variety of responses, best will be plans that deal with the situation based on the survival psychology skills from EO M190.04 (Discuss Survival Psychology, A-CR-CCP-801/PF-001, Chapter 15, Section 4).

Other questions and answers will develop throughout the group discussion. The discussion should not be limited to only those questions suggested. However, the discussion should stay on the main topic and not become sidetracked by unrelated issues.

If the main points do not develop from the discussion ensure they are covered before proceeding to the conclusion.

Review the main points brought up by the cadets before beginning the conclusion.

CONCLUSION

REVIEW

Upon completion of the group discussions, the instructor will conclude by summarizing the discussions to ensure that all teaching points have been covered. The instructor must also take this opportunity to explain how the cadet may apply this knowledge to future situations.

MAIN TEACHING POINTS

The review of the teaching points shown here is based on possible cadet responses and can serve as a guide to what can be expected.

The review to be given to the cadets shall be based on the cadets' responses during the group discussions as noted on the Main Teaching Points Review Worksheet.

TP1. Stage 1: Concrete Experience: Cadets have an experience and take time to identify and define what the experience was.

The cadets experienced the emotions and stresses of being in the bush, alone, and at night. They then identified and defined what they experienced.

TP2. Stage 2: Reflective Observation: Cadets reflect upon and examine what they saw, felt and thought while they were having the experience.

The cadets reflected on the experience, examining their emotions and how they dealt with them. For many the experience was a stressful one.

TP3. Stage 3: Abstract Conceptualization: Cadets work to understand and make connections from the experience to new or different situations.

The cadets used their past experiences, with reference to a past survival psychology lesson, to make connections in order to analyze and learn from the experience. They also considered how the situation would have been different if they had not been alone.

TP4. Stage 4: Active Experimentation: Cadets look ahead to, and plan for, the application of skills and knowledge acquired to future experiences.

After looking back at their experience and what they could have done differently, the cadets actively imagine and then plan for future survival situations.

Reinforce those answers given and comments made during the discussions, but ensure the main teaching points have been covered. Using the cadets' answers and comments will personalize the learning experience.

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-826/PG-001, Chapter 3, Annex B, Appendix 1 (S291 PC).

CLOSING STATEMENT

It is your will to survive that is the most important factor in determining if you will succeed in a survival situation. The will to survive cannot be taught, but by using your past experiences and knowledge, you can better prepare yourself to deal with similar situations in the future.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

A3-016 B-GA-217-001/PT-001 (n.d.). *Down but Not Out*. Ottawa, ON: National Defence.

C3-005 Sierra Club, San Diego Chapter. (1999). *Wilderness Basics: The Complete Handbook for Hikers & Backpackers*. Portland, OR: The Mountaineers Books.

C3-150 (ISBN 0-8117-3292-4) Davenport, G. (2006). *Wilderness Survival: Second Edition*. Mechanicsburg, PA: Stackpole Books.

ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 3

EO S291.03 – ASSEMBLE AN EMERGENCY SURVIVAL KIT

Total Time: 40 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Prepare an emergency survival kit to be used as an example, with as many items possible as listed in TP 3.

Organize the emergency kit items needed for TP 3. Keep these items out of sight until each item is discussed. Items that will be presented to the cadets during the lesson should be organized and ready to be distributed in the quantities/lengths as authorized by the CSTC.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for this lesson to present basic material and give direction on assembling an emergency survival kit.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadets shall have assembled an emergency survival kit.

IMPORTANCE

It is important for cadets to be prepared for survival situations. Carrying an emergency survival kit at all times while in the field and knowing the purpose of the contents will enable the cadets to react appropriately to such situations.

Teaching Point 1 **Discuss the Characteristics of an Emergency Survival Kit**

Time: 5 min Method: Interactive Lecture

ESSENTIAL ITEMS

An emergency survival kit's items must meet the needs of a person in a survival situation. The items to fulfill these needs can be categorized.

Personal Protection. This includes clothing, shelter, and fire.

Signalling. Constructed signals are ground-to-air signals and signal fires. An improvised signal may be a piece of shiny metal used as a signal mirror.

Sustenance. Water and food.

Travel. Navigating with and without a compass.

Health. This includes mental health which is very important for the will to survive, trauma and environmental injuries.

SMALL AND EASY TO CARRY IN A POCKET

If the emergency survival kit is not with the person when it is needed, it is worthless. It needs to be carried at all times during outdoor activities.

It should be small enough to fit into a pocket, but not so bulky as to restrict movement.

It should be easy and comfortable to carry so that once placed in the pocket, it stays there until the outdoor activities are over or it is needed.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. Name the five categories that should be considered when choosing essential items for an emergency survival kit.

Q2. When should you carry an emergency survival kit?

Q3. Where should an emergency survival kit be located?

ANTICIPATED ANSWERS

A1. Personal protection, signalling, sustenance, travel, and health.

A2. At all times during outdoor activities.

A3. It should be in your pocket.

Teaching Point 2 **Explain That Emergency Survival Kit Items Should be Placed in a Durable Container That is Lightweight and Waterproof**

Time: 5 min Method: Interactive Lecture

The items in an emergency survival kit need to be readily available. The items must also be in a useable condition, neither damaged by water nor compression (squished).

DURABLE

A container for an emergency survival kit must be durable to prevent compression, which can damage the items within.

LIGHTWEIGHT

The container should be lightweight. If it is too heavy, it becomes a burden to carry and therefore may be packed in the rucksack/backpack and not with the person when needed.

WATERPROOF

The container should be waterproof to protect items from water damage. Damaged items may not be of help in a survival situation.

Different types of containers have different characteristics which should be taken into account before deciding on which type a person will use. Types of containers include:

- **Hard Plastic.** Very durable but may be uncomfortable to carry in a pocket.
- **Flexible Plastic.** Durable, more comfortable than hard plastic in a pocket.
- **Metal.** Very durable but may be uncomfortable to carry in a pocket. However, unlike the plastic containers, a metal container may be used over a fire for multiple uses (eg, cooking, purifying water).

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. What three features should an emergency survival kit container have?

Q2. What are the differences between containers made from hard and flexible plastic?

Q3. What may be done with a metal container but not a plastic one?

ANTICIPATED ANSWERS

A1. It should be durable (to prevent compression), lightweight and waterproof (to protect items from water damage).

A2. The hard plastic container is more durable, but the flexible plastic container will be more comfortable to carry in a pocket.

A3. It may be used over a fire.

Teaching Point 3 **Identify the Purpose of Each Emergency Survival Kit Item**

Time: 20 min Method: Interactive Lecture

The instructor should present this TP as follows:

1. Ensure items that will be distributed are out of sight and ready to be distributed.
2. Distribute the emergency survival kit containers to the cadets.
3. Open the example emergency survival kit (contents not visible to cadets).
4. Begin by asking cadets what items should be in an emergency survival kit.
5. As each item is suggested:
   a. list it on the whiteboard/flip chart;
   b. if the item suggested is in the example emergency survival kit, show it to the cadets;
   c. discuss its purpose; and
   d. if the item suggested is to be distributed, distribute it at this time and have the cadets place it in their personal emergency survival kit.
6. Ensure items that are listed but not suggested by the cadets are mentioned.

Note: The items should not be visible to the cadets in order to allow them to think of the items needed and not just name the items they can see in front of them.

IDENTIFY THE PURPOSE OF EACH EMERGENCY SURVIVAL KIT ITEM

Adhesive Bandages. Used for minor first aid.

Aluminum Foil. May be used for cooking, water collection, and signalling.

Antibiotic Tablets. Used to reduce the health risk of injuries.

Button Compass. Used to determine direction.

Candle. May be used as a light source and a fire starter.

Condom. Used for water storage.

Cord. Used for lashings in multiple applications.

Cotton Balls. May be used as tinder and to perform minor first aid.

Emergency Blanket. Used to keep warm and may also be used for signalling.

Fish Hooks. Used to catch fish.

Fishing Line. Used to catch fish, but may also be used for lashings.

Fishing Sinkers. Used to catch fish.

Flexible Saw. Used to cut wood.

Garbage Bag (Small). This item has multiple uses: for raingear, as a water collector and for food storage.

Hard Candies. Used as an energy food. It is also a morale booster.

Magnifying Glass. Used to light fires and for first aid (to find small splinters).

Mirror (Small). Used for signalling.

Moleskin. This item may be used as minor first aid for blisters.

Pain Reliever (Pills). Acetylsalicylic acid or acetaminophen, use as a pain reliever.

Paper. Used to write notes and may be used as tinder.

Pencil. Used to write notes.

Personal Medication. Used to maintain health.

Re-Sealable Plastic Bags (Very Small). Used to waterproof and organize small items within the kit.

Safety Pins. These have multiple uses: to perform minor first aid and to repair clothing and equipment.

Salt. Used to maintain health.

Sewing Needles. This item may be used for minor first aid and to repair clothing and equipment.

Small Folding Knife. Most versatile item in the survival kit.

Snare Wire. Used to catch small animals and may also be used for lashings.

Thread. This item has multiple uses: used to create small lashings, for minor first aid and to repair clothing and equipment.

Tweezers. Used for minor first aid and to untie knots (so cord may be reused).

Water Purification Tablets. Used to purify water.

Waterproof Matches. Used to light fires.

Whistle. Used to signal for help and to help scare off animals.

This list is not exhaustive and is designed to give cadets choice. By the end of this TP the cadets will have a container partially filled with items which will serve as the base for their own emergency survival kit. Inform the cadets that they are expected to carry their emergency survival kit for the rest of the course.

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in the discussion and their assembly of an emergency survival kit will serve as the confirmation of this TP.

Teaching Point 4 **Discuss Regular Maintenance Checks on Emergency Survival Kit Items**

Time: 5 min Method: Interactive Lecture

Items in an emergency survival kit should be checked before starting outdoor activities.

During the regular maintenance check, the following should be examined:

- Check items with expiry dates. Also check personal prescription medications to ensure that the prescription is one still being taken.
- Replace worn or damaged items.
- Replace missing items.
- Replace used items.

CONFIRMATION OF TEACHING POINT 4

QUESTIONS

Q1. When should an emergency survival kit be checked?

Q2. Why should you check your personal prescription medications?

Q3. What should be done about worn, damaged or missing items?

ANTICIPATED ANSWERS

A1. It should be checked before starting outdoor activities.

A2. Check personal prescription medications for the expiry date and to ensure the prescription is one still being taken.

A3. These items should be replaced.

END OF LESSON CONFIRMATION

The cadets' assembly of an emergency survival kit will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-826/PG-001, Chapter 3, Annex B, Appendix 1 (S291 PC).

CLOSING STATEMENT

Being in possession of an emergency survival kit will greatly enhance your capabilities in a survival situation.

INSTRUCTOR NOTES/REMARKS

The emergency survival kit shall be kept by the cadet and serve as a foundation for their own personnel emergency survival kit.

The cadet shall have the kit in their possession at all times for the duration of the course.

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ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 4

EO S291.04 – LIGHT A FIRE

Total Time:	120 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Prepare examples of the alternative methods of lighting a fire, in TP 2.

Additional supervision is required during the lighting of the fires. Fire safety equipment shall also be present.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TP 1 as it allows the instructor to review factors in fire lighting.

A demonstration was chosen for TP 2 as it allows the instructor to demonstrate the skills while providing the cadets with knowledge on the subject matter.

A practical activity was chosen for TPs 3–4 as it is an interactive way to allow cadets to practice fire lighting skills in a safe, controlled environment.

INTRODUCTION

REVIEW

EO M190.07 (Light, Maintain and Extinguish a Fire, A-CR-CCP-801/PF-001, Chapter 15, Section 7) will serve as the review for this lesson.

OBJECTIVES

By the end of this lesson the cadet shall have constructed, lit, maintained and extinguished a fire.

IMPORTANCE

It is important for cadets to be able to light a fire. The second element of the survival pattern is fire, which provides heat, light and comfort. A fire also provides a means to cook food, scare away predators and signal rescuers if the cadet becomes lost.

Teaching Point 1 **Review the Steps Required to Light a Fire**

Time: 20 min Method: Interactive Lecture

Discuss how the Fire Weather Index and the Canadian Forest Fire Danger Rating System (CFFDRS) measures the possibility of forest fires.

The level of experience with fires can vary greatly among the cadets. Pay particular attention to any individuals who exhibit bad habits when dealing with fire and work to correct their bad habits.

Prior to starting a fire, some simple guidelines must be followed. Ensure fire safety equipment is available before starting a fire.

Shovel. A shovel provides a means to smother the fire. Shovelling dirt, gravel or sand on a fire reduces oxygen, thus extinguishing the fire.

Rake. A rake allows one to disperse burning material away from the fire. A rake can also be used to smother the fire by raking dirt, gravel, or sand onto the fire.

Pail Filled With Sand or Water. A pail of sand or water can be immediately thrown over a fire if it starts to get out of control. This item can also be refilled as many times as required.

Fire Extinguisher. A fire extinguisher is designed to tackle a fire for a short duration. It is very effective in extinguishing a small fire that is getting out of control.

FIRE SAFETY

Fire Weather Index

Before conducting training in provincial or national parks, one must confirm that fires are allowed. Open fires are normally only allowed in designated areas. Open fires are fires that are not contained in a structure or housing that ensures the fire will not spread (eg, barrel or fireplace). Each park will clearly state their fire regulations and restrictions.

Parks commonly follow the Fire Weather Index, which provides an assessment of relative fire potential that is based solely on weather observations. Check with park administration for rules and regulations when planning to light fires within the park boundaries.

Canadian Forest Fire Danger Rating System (CFFDRS)

The CFFDRS is Canada's national system for rating forest fire danger. The system evaluates and integrates data to help managers predict woodland fire potential.

The CFFDRS provides an index (as illustrated in Figure 1-4-1) on how easy it is to ignite vegetation, how difficult a fire may be to control, and how much damage a fire may do.

BLUE	GREEN	YELLOW	ORANGE	RED
LOW	MODERATE	HIGH	VERY HIGH	EXTREME

D Cdts 3, 2007, Ottawa, ON: Department of National Defence

Figure 1-4-1 Fire Index

Low. Fires that do occur are likely to be self-extinguishing and new ignitions are unlikely.

Moderate. These fires are creeping or gentle surface fires. They are easily contained by ground crews with water pumps.

High. These fires are challenging for ground crews to handle and heavy equipment (tanker trucks and aircraft) are often required to contain the fire.

Very High. These fires are fast spreading and are of high intensity. They are hard to control and require aircraft support.

Extreme. The environment is very dry and chances of fire are extreme. These fires are fast spreading, of high intensity and very difficult to control.

Advise cadets they can review this information for themselves by looking up the CFFDRS on the internet for their area at https://nofc1.cfsnet.nfis.org/mapserver/cwfis/index.phtml

CONSTRUCTING A FIRE

Review the three required elements for fire, including:

- oxygen,
- heat/spark, and
- fuel.

"The Fire Triangle", by Answers.com, Copyright 2006 by Answers Corporation, Retrieved November 20, 2006, from http://www.answers.com/topic/fire-triangle

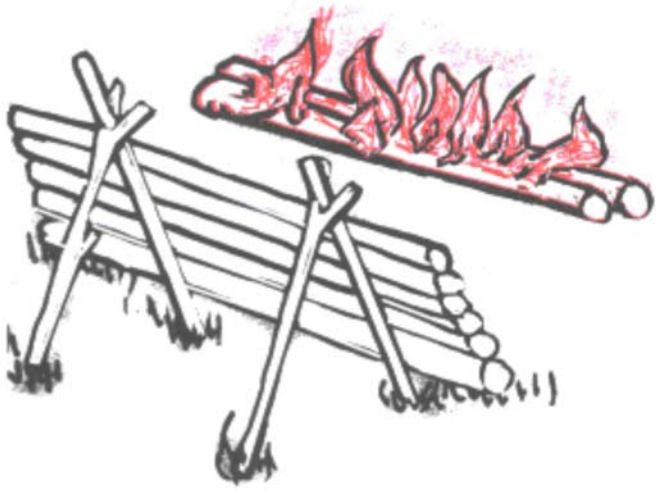
Figure 1-4-2 Fire Triangle

Selecting an Appropriate Site

Before beginning to build a fire, think about the location. It should be placed for maximum warmth and convenience without sacrificing safety. Consider the following when choosing a fire site:

- The fire site should be high, dry and close to the source of fuel.
- The site should be sheltered and away from windy areas to reduce flare ups.
- There should be a means of extinguishing the fire close by.
- The ground should be clear from all flammable material before starting.
- The fire should not be built against an old log or tree trunk.
- The site should be clear of over-hanging boughs and branches.
- The site should be 1–2 m from the shelter entrance.

Firewall. A wall that prevents the spread of a fire. Building a firewall makes the fire more efficient by redirecting the heat and reduces the amount of fuel required to maintain high heat. In a survival situation, it is important to use as little energy as possible. With a firewall the need for gathering wood is reduced.



P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 99)

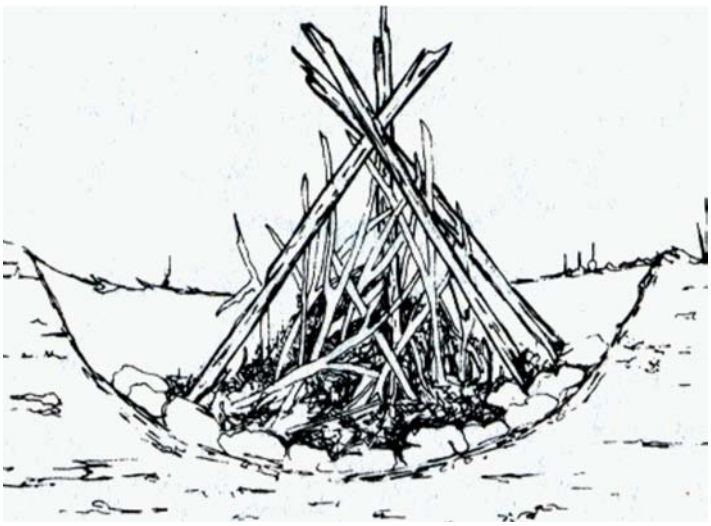
Figure 1-4-3 Firewall

Fire Ring. A barrier that contains a fire within its boundaries while protecting it from the elements. A fire ring reduces the fire's ability to spread and protects it from the wind. A fire ring should be made of small rocks to allow the heat to reach the cadets. Place the rocks side by side in a circle to complete the ring. Rocks that have been submerged in water should not be used as the moisture contained inside these rocks will expand and may cause the rocks to explode.

A-CR-CCP-107/PT-002, Royal Canadian Army Cadets Course Training Plan Corps Training Program Winter Adventure Training Manual (p. 3-20)

Figure 1-4-4 Fire Ring

Firepit. A fire can be placed in a pit if no rocks are present. Dig a hole with sloping sides 15–30 cm deep, depending on the width of the fire. This depression cradles the fire, grouping its coals toward the centre to help them burn longer and hotter. Be careful not to make the pit too deep, or the heat may not reach the cadets.



T. Brown, Jr. and B. Morgan, Tom Brown's Field Guide: Wilderness Survival, The Berkley Publishing Group (p. 62)

Figure 1-4-5 Firepit

Before constructing a fire ring or pit, determine how big the fire will be. A small fire is much easier to control and saves fuel, but in certain survival situations it is important to maintain a high level of heat throughout the night.

Collecting Fuel

Fire requires fuel to burn. When preparing to light a fire in a survival situation it is important to find enough fuel to supply the fire for at least a 24-hour period. Remember to keep physical exertion low, since food and water may be difficult to obtain during this time. When selecting fuel, there is one key rule, it must be dry.

The driest wood is found high up, away from water sources and on south-facing hillsides with open exposure to the sun. Avoid collecting fire-starting material from the ground, as it may be damp, especially during wet weather. Gather dead, dry vegetation from standing trees and plants.

Tinder. Tinder is any kind of material that takes the minimum of heat to light. Good tinder needs only a spark to ignite. Tinder can be:

- accelerants (gasoline),
- birch bark,
- shredded inner bark from cedar, chestnut or red elm trees,
- fine wood shavings,
- dead grass, ferns, moss, fungi,
- straw,
- sawdust,
- dead evergreen needles,
- punk (the completely rotten portions of dead logs),
- evergreen tree knots,
- bird down (fine feathers),
- down seed heads (milkweed, dry cattails, bulrush or thistle),
- fine, dried vegetable fibres,
- dead palm leaves,
- lint from pockets and seams,
- char cloth,
- waxed paper,
- outer bamboo shavings, or
- cotton.

Kindling. Used in the starting of a fire and is the next type of material required to raise the flames from the tinder, allowing less combustible fuel to be burned. The best kindling is composed of materials that range in size from small twigs to that of a pencil. Softer wood is preferable because it flares up quickly. Kindling can be:

- small twigs,
- small strips of wood,
- split wood,

- heavy cardboard,
- pieces of wood removed from inside larger pieces, and
- wood that has been doused with highly flammable materials (gasoline, oil or wax).

Fuel. Anything that will burn and maintain a fire. Wood is the most common form of fuel. Dry wood should be used initially to increase the amount of heat and coals. Once the fire is burning well, green or damp wood may be added. Hard wood is best for maintaining a fire for long periods of time as soft wood will burn too quickly. Fuel can be:

- dry standing wood and dry, dead branches,
- dry inside (heart) of fallen tree trunks and large branches,
- green wood that is finely split,
- dry grasses twisted into bunches,
- peat dry enough to burn (this may be found at the top of undercut banks),
- dried animal dung,
- animal fats, and
- coal or oil.

LIGHTING A FIRE

The steps for lighting a fire are based on using a match.

To prepare a fire, build it step by step. Start by laying out fuel in organized piles of kindling, tinder and larger fuels. Follow these steps:

1. Collect the following natural materials (based on a one-hour fire):
   a. two large fistfuls of tinder,
   b. approximately 30 pencil-size sticks for kindling, and
   c. ten wrist-thick pieces of fuel.

It is always a good idea to carry some tinder in a survival kit, because dry tinder can be difficult to obtain in a survival situation.

Place the material next to your cheek; if it feels cool, it is too wet to burn efficiently.

2. Form a teepee with three 15 cm long sticks.
3. Place smaller sticks on the floor as a platform for the tinder.
4. Pack the teepee with the tinder.
5. Lean the smallest sticks onto the teepee then place the next size of sticks on top; repeat.

6. Leave a gap (door) in the teepee to insert a match or burning piece of tinder, so it will make contact with the tinder at the centre.
7. Slowly add the 10 largest sticks in a star pattern. Adding larger fuel too soon may smother the fire.
8. Strike the match close to the opening and protect the flame from the wind with your hands.
9. Carefully insert the match and light the tinder.
10. If necessary, gently blow on the tinder to assist with combustion.

Allow for air to reach the kindling and tinder. Do not apply too much kindling at once as the fire may be starved of air. Air should naturally be able to flow, without additional assistance, to encourage growth of the fire.

In the case of wet weather or if experiencing difficulty establishing a fire, “feather sticks” can be made (as illustrated in Figure 1-4-6). Feather sticks increase the chance of the fuel catching fire because the increased surface area and thinner wood requires less heat to ignite.

Follow these steps to build a feather stick:

1. Find a small dry stick.
2. Slice partial shavings leaving the shaving attached to the stick.
3. Shave using small thin cuts.

A-CR-CCP-107/PT-002 (p. 3-20)

Figure 1-4-6 Feather Sticks

MAINTAINING A FIRE

Maintaining a fire requires a constant source of fuel. Maintain a fire by:

- **Applying Fuel.** Once the fire has a strong base of red hot coals, apply fuel.
- **Ensuring Ventilation.** Applying fuel may smother the fire. Place fuel so air is able to circulate. If the fuel is too large and there is no axe available it can be placed in the fire by laying one end into the centre of the fire and the other end extending out to the edge of the fire. Continue this process around the fire. Leave spaces between the bulk firewood for air to circulate. Feed the fire by slowly moving the fuel in as it is burned.
- **Maintaining Fire Size.** Fires can easily be over-fuelled. To maintain the correct size, limit the amount of fuel used until desired size and warmth is achieved. If the fire is for cooking, hot coals and less fuel is sufficient.

In a snow-covered area, a fire will not light directly on the snow. If possible, clear the snow away to the ground. If the snow is too thick, create a dry base for the fire by using green logs. Trees with wrist-sized trunks can easily be broken in extreme cold. Cut or break several green logs and lay them side by side on top of the snow. Create more than one layer. Build a snow wall to protect the fire from the wind.

EXTINGUISHING A FIRE

Smothering the Fire

As the fire burns, plan ahead to extinguish it. Stop feeding the fire long before it must be extinguished allowing the remaining fuel to burn off. Collect and pile the remaining chunks of burning wood so they are consumed by the flames, leaving only ashes and coals to dispose of when the fire has finished burning.

Once the fire has burned itself down to white ash, douse it thoroughly with water. Pour water over the ashes, stirring them occasionally to ensure the coals are completely extinguished. If large pieces of fuel remain, remove them from the fire with a rake or shovel. Smother the fire with water and earth until there is no steam or smoke remaining. Ensure the larger pieces are smothered properly and kept away from any other combustible material. Larger pieces may be saved them to construct a fire the following day.

Filling in the Fire Site

Once the fire is completely smothered, replace or fill the fire site with wet earth or sand to ensure no flare-ups will occur. If this is a new fire site, scatter the ashes and replace the sod or decomposing material from the forest floor, returning the site to its original condition.

Ensuring the Fire Site is Cold to the Touch

Before leaving the site, ensure the ground is cold to the touch. Hot coals buried in the earth can still start a root fire.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. What three elements are required to start and maintain a fire?

Q2. What is a firewall and what does it do?

Q3. What are the steps to extinguishing a fire?

ANTICIPATED ANSWERS

A1. Oxygen, heat (spark) and fuel.

A2. A wall that prevents the spread of a fire. Building a firewall makes the fire more efficient by redirecting the heat and reduces the amount of fuel required to maintain high heat. In a survival situation, it is important to use as little energy as possible. With firewall the need for gathering wood is reduced.

A3. Smothering the fire, filling in the fire site and ensuring the ground is cold to the touch.

Teaching Point 2 **Explain and Demonstrate Lighting a Fire Using an Alternative Method**

Time: 40 min Method: Demonstration

The instructor will demonstrate the following alternative methods of lighting a fire. There is no requirement for the instructor to create fire, but each method should be explained and demonstrated.

ALTERNATIVE METHODS OF LIGHTING A FIRE

In a survival situation, there may be no normal means of lighting a fire. In these situations it is necessary to find alternative methods to light a fire.

Fire Bow and Drill

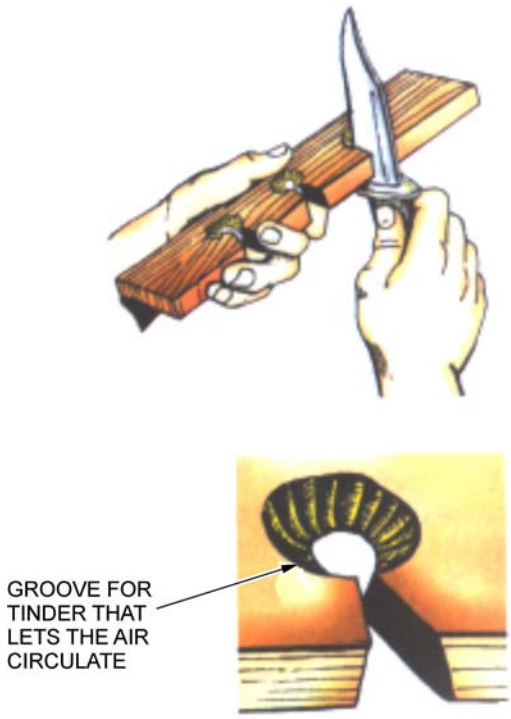
The fire bow and drill uses friction and pressure to heat a piece of wood and create a fine black powder that will light some tinder. This method takes practice, but can easily be repeated over and over with nothing but materials found in the environment. The following steps are required to light a fire with a fire bow and drill:

1. Collect the following materials:
   a. one hardwood shaft 2 cm thick and 30 cm long,
   b. one softwood base 5 cm wide 20 cm long and 2 cm thick,
   c. one bearing block or socket,
   d. one stick 60–90 cm long to make the bow (green wood from a sapling is best), and
   e. one piece of cord.
2. Cut a groove into the bearing block or socket 3–5 cm deep for the hardwood shaft to fit (as illustrated in Figure 1-4-7).

P. Tawrell, Camping and Wilderness Survival, Second Edition, Leonard Paul Tawrell (p. 434)

Figure 1-4-7 Bearing Block

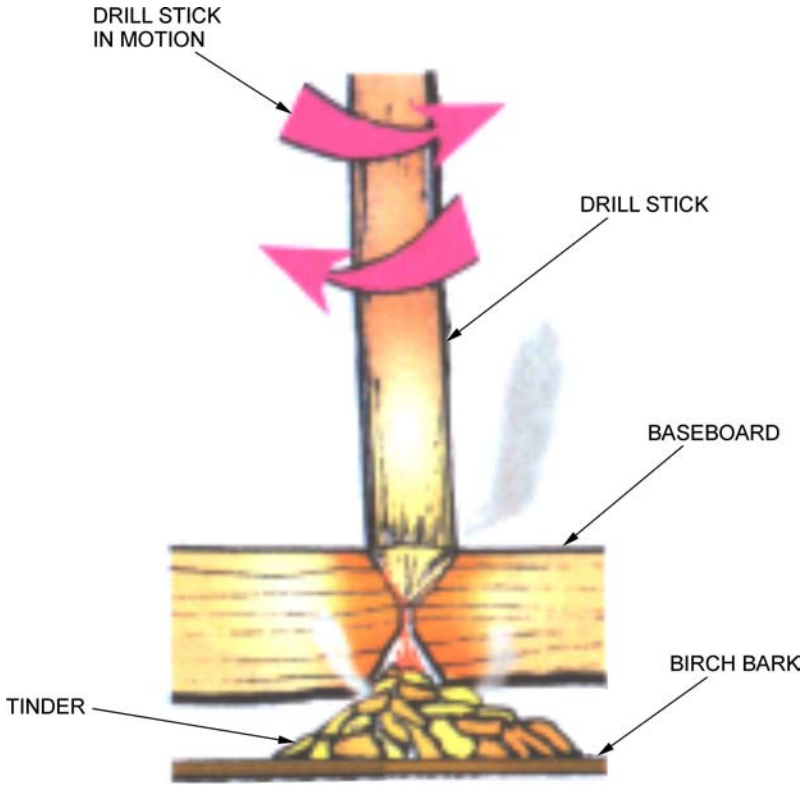
3. Cut a groove into the softwood base in which the hardwood shaft will spin. The groove should be open on one end for the heat and embers to escape.



P. Tawrell, Camping and Wilderness Survival, Second Edition, Leonard Paul Tawrell (p. 434)

Figure 1-4-8 Softwood Base

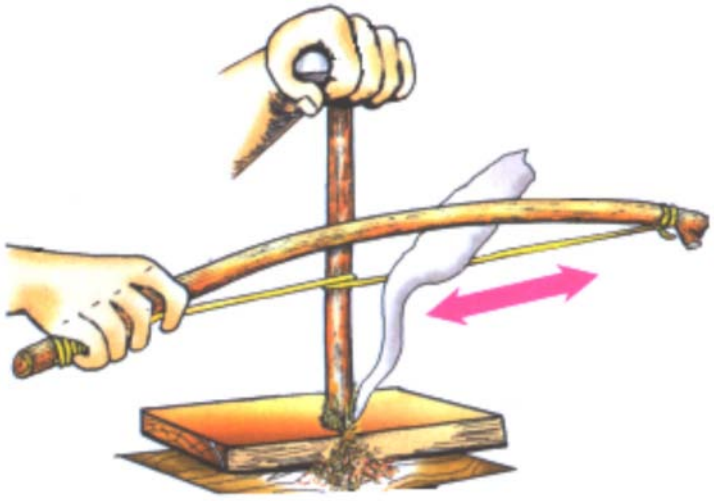
4. Carve one end of the hardwood shaft into a small point.
5. Place tinder in this opening in which the embers will fall.



P. Tawrell, Camping and Wilderness Survival, Second Edition, Leonard Paul Tawrell (p. 434)

Figure 1-4-9 Drill

6. Wrap the bow around the hardwood shaft and place it into the groove on the softwood base.
7. Place the bearing block on the top of the shaft.
8. Slowly at first, start sawing the bow back and forth so the hardwood shaft spins back and forth.



P. Tawrell, Camping and Wilderness Survival, Second Edition, Leonard Paul Tawrell (p. 434)

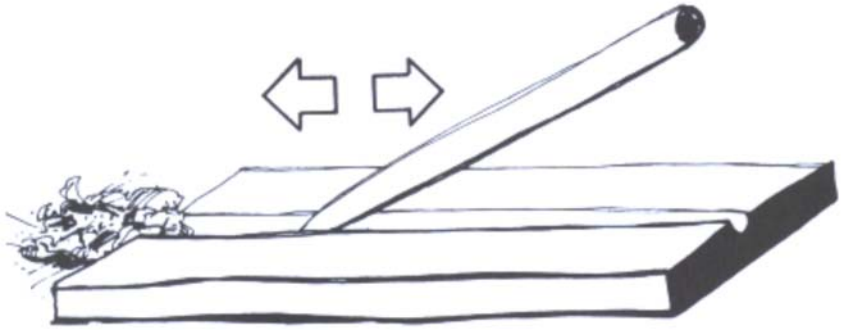
Figure 1-4-10 Fire Bow and Drill

9. Maintain a constant motion back and forth; consistency is more important than speed.

10. Once smoke appears increase speed and look for embers to start to appear.
11. Once the tinder begins to smoke, stop and lightly blow on the tinder to start combustion.
12. When the tinder lights, apply gathered kindling and fuel as required.

Fire Plough

A groove is cut into a softwood base and a hardwood shaft is pushed, under heavy pressure, rapidly up and down the groove. This friction produces heat which lights tinder placed at the end of the groove. This method requires more energy and practice than the bow drill method.



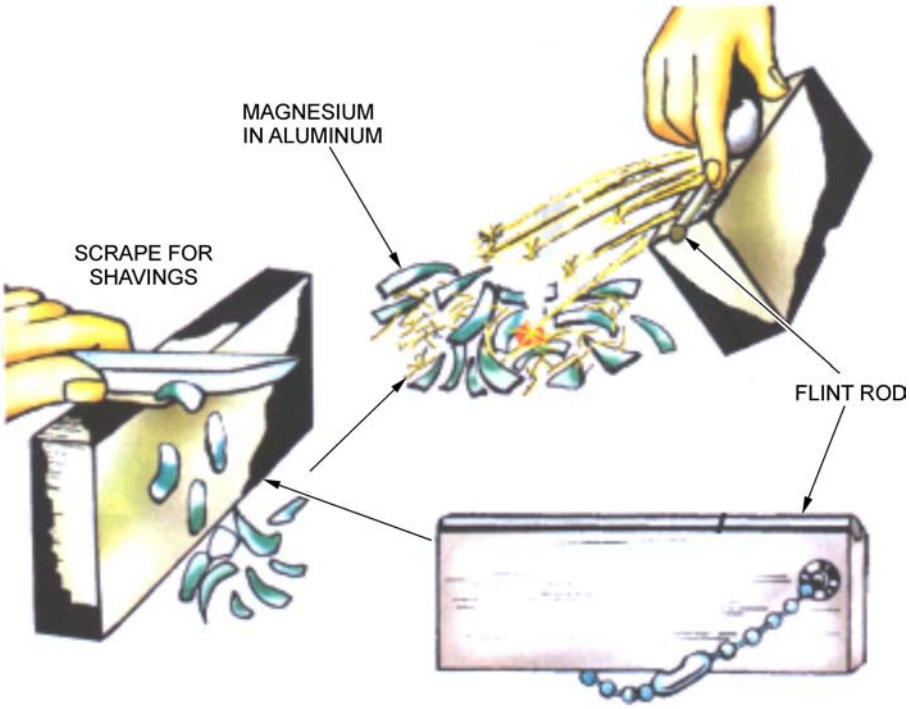
J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 245)

Figure 1-4-11 Fire Plough

Flint and Steel

This is the best method to light tinder aside from matches. Hold the flint as close to the tinder as possible and strike it with the back of a knife blade or a small piece of carbon steel. Strike downward so that the sparks fall into the tinder. When the tinder begins to smoulder, fan or blow it gently into a flame.

A magnesium fire block (as illustrated in Figure 1-4-12) is similar to the flint and steel but incorporates a chunk of magnesium in aluminum that can be shaved off to assist in lighting. Cut or scratch shavings off the block which are ignited by striking the back of a knife on the flint rod. Magnesium generates tremendous heat. Be careful that no shavings land on skin or clothing.



P. Tawrell, Camping and Wilderness Survival, Second Edition, Leonard Paul Tawrell (p. 436)

Figure 1-4-12 Magnesium Fire Block

Battery

Remove the battery from an aircraft or vehicle. Attach one wire to the positive terminal and one to the negative terminal. Place some tinder in a pile and touch both wires together, for a brief moment, over or in the tinder. This method can damage or destroy the battery if done too frequently. Ensure the battery is removed from the vehicle first, to avoid starting an engine fire. A car's cigarette lighter can be used with tissue or cloth as well.

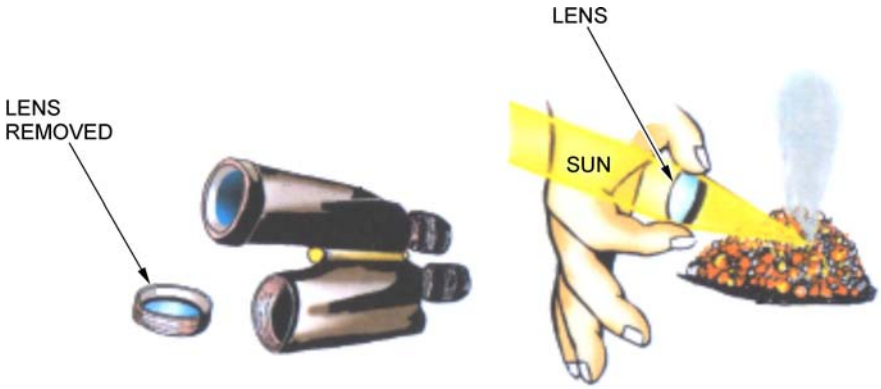
Battery and Steel Wool

A nine volt battery will work the best. Hold the terminals of the battery against a piece of fine steel wool to create a small fire. Add the steel wool to tinder. This method requires supplies that may be difficult to acquire if there is no prepared survival kit on hand.

Magnifying Glass

A convex lens (a lens where the centre bulges out) from binoculars, a lens from a camera or telescope, the bottom of an old pop bottle or can, a piece of ice or a magnifying glass may be used to light tinder with the help of the sun. Use the lens to direct a point of sunlight onto the tinder and hold until the tinder begins to smoke.

Fire can be created from an old pop can and a chocolate bar. The bottom of the pop can is shaped like a lens but not very reflective. Polish the bottom of the can with chocolate like polishing a pair of boots until it has a mirror finish. Use the sun to focus the light onto some tinder. This method takes a lot of time to create the mirror image, but it works.



P. Tawrell, Camping and Wilderness Survival, Second Edition, Leonard Paul Tawrell (p. 437)

Figure 1-4-13 Convex Lens

Char Cloth

Char cloth is linen or cotton that has been combusted in the absence of oxygen. It is extremely flammable and easily ignited by even the weakest of sparks. Any method of burning cloth without oxygen will create char cloth. The most common way to create char cloth is in a metal coffee tin. Follow these steps:

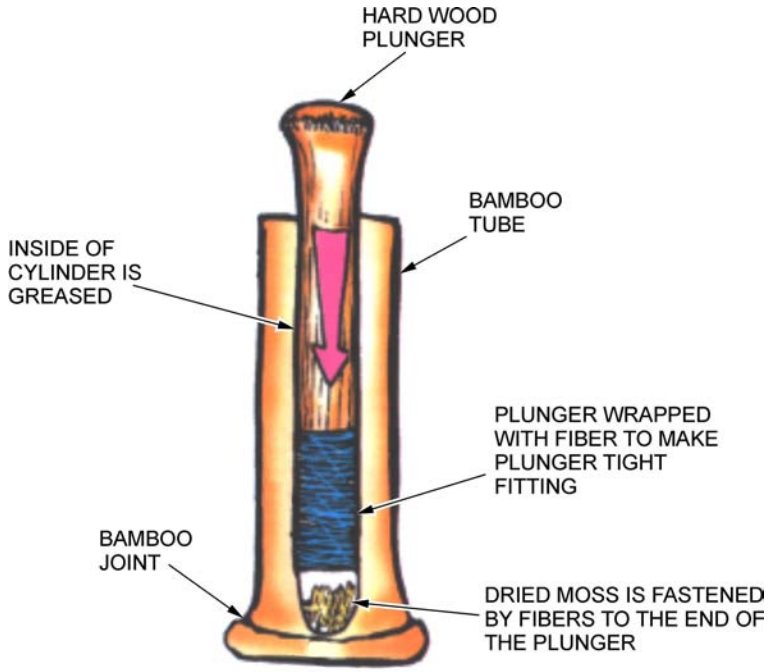
The instructor will demonstrate how to create char cloth. There is no requirement to demonstrate lighting a fire with it.

1. Pack the cloth tightly in the container.
2. Punch a small hole in the lid to allow gas to escape.
3. Seal the lid to the container.
4. Place the container in the embers of the fire and ensure the escaping gases do not catch fire.
5. Remove when the black smoke stops coming out of the hole.
6. Plug the hole and cool.
7. Use the char cloth as tinder to light a fire.

Another method is to sandwich a piece of cloth between two pieces of metal and heat at a high temperature for several hours in an oven or over a fire and keep it ready in a survival kit. When doing this method over a fire, the pieces must fit together tightly to ensure the piece of cloth does not catch on fire.

The Fire Piston

The fire piston consists of a hollow cylinder sealed at one end and open at the other. A piston can slide into the cylinder forming an airtight seal with the cylinder wall. The piston has a handle on the end to allow a firm grip to be applied to it and can be completely withdrawn from the cylinder. Primitive and modern versions are made from wood, horn, antler and bamboo. The piston has a notch or recess in its face into which a piece of tinder is placed. The piston must be rammed rapidly into the sealed cylinder with a single stroke. The compression of the air causes the temperature to rise rapidly to 260 degrees Celsius, hot enough for the tinder on the piston face to ignite. Remove the piston and transfer the ember to a larger mass of kindling to create a fire.


HARD WOOD PLUNGER
BAMBOO TUBE
INSIDE OF CYLINDER IS GREASED
PLUNGER WRAPPED WITH FIBER TO MAKE PLUNGER TIGHT FITTING
BAMBOO JOINT
DRIED MOSS IS FASTENED BY FIBERS TO THE END OF THE PLUNGER

P. Tawrell, Camping and Wilderness Survival, Second Edition, Leonard Paul Tawrell (p. 435)

Figure 1-4-14 The Fire Piston

CONFIRMATION OF TEACHING POINT 2

The cadets' observation of the various alternative fire lighting methods will serve as the confirmation of this TP.

Teaching Point 3 **Have the Cadet Construct and Use a Fire Bow and Drill**

Time: 20 min Method: Practical Activity

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets construct and practice using a fire bow and drill.

RESOURCES

- Knife,
- Hardwood shaft 2 cm thick and 30 cm long,
- Softwood base 5 cm wide 20 cm long and 2 cm thick,
- One bearing block or socket, and
- One stick 60–90 cm long to make the bow (green wood from a sapling is best), and
- Cord,
- Water, and

- Shovel.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

Using the materials provided, have each cadet construct and use a fire bow and drill, to include:

1. cutting a groove into the bearing block or socket a few centimetres deep for the hardwood shaft to fit;
2. cutting a groove into the softwood base in which the hardwood shaft will spin. The groove should be open on one end for the heat and embers to escape;
3. carving one end of the hardwood shaft into a small point;
4. collecting kindling, tinder and fuel as required;
5. placing tinder into the opening of the softwood base for the embers to fall onto;
6. wrapping the bow around the hardwood shaft and place into the groove on the softwood base;
7. gathering kindling and fuel as required;
8. placing the bearing block on the top of the shaft;
9. sawing the bow back and forth so the hardwood shaft spins back and forth;
10. maintaining a constant motion back and forth; consistency is more important than speed;
11. increasing speed and looking for embers, once smoke appears;
12. stopping and lightly blowing on the tinder to start combustion, once the tinder begins to smoke; and
13. applying gathered kindling and fuel as required, when the tinder ignites.

There is no requirement for the cadets to light a fire using this method, since it is a very challenging skill to master. Cadets are only required to construct and attempt to use the fire bow and drill, but are encouraged to attempt the other alternative methods of lighting a fire if time permits.

SAFETY

Firefighting equipment must be present during the lighting of fires.

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in this activity will serve as the confirmation of this TP.

Teaching Point 4 **Have the Cadet Light and Maintain a Fire**

Time: 30 min Method: Practical Activity

ACTIVITY

OBJECTIVE

The objective of this activity is to have each cadet construct, light, maintain and extinguish a fire. The fire must be maintained for 10 minutes.

RESOURCES

- Matches, and
- Firefighting equipment.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

If space is limited, have the cadets go in shifts and maintain a fire for a shorter period of time.

If the fire rating is too high during this time, find an alternative location to perform this activity. Either at a local fire hall or other location where the fire rating is lower.

If a cadet wishes to challenge themselves using an alternative method they may, but ensure that the cadet is able to light and maintain a fire for 10 minutes.

Have each cadet construct, light, maintain and extinguish a fire using the following steps:

1. Choose a site.
2. Collect enough tinder, kindling and fuel to maintain a fire for 10 minutes.
3. Prepare the fire site.
4. Prepare the tinder and kindling.
5. Light the fire using as few matches as possible.
6. Build up the fire using kindling.
7. Maintain the fire for 10 minutes.
8. Extinguish the fire and ensure the ground is cold to the touch.

SAFETY

Firefighting equipment must be present during the lighting of fires.

CONFIRMATION OF TEACHING POINT 4

The cadets' participation in this activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in constructing, lighting and maintaining a fire will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-826/PG-001, Chapter 3, Annex B, Appendix 1 (S291 PC).

CLOSING STATEMENT

It is important for cadets to be able to light a fire. The second element of the survival pattern is fire, which provides heat, light and comfort. A fire also provides a means to cook food, scare away predators and signal rescuers if the cadet becomes lost.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

C3-002 (ISBN 0-00-653140-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.

C3-003 (ISBN 1-896713-00-9) Tawrell, P. (1996). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Paul Tawrell.

C3-070 The Weather Network. (2006). *The Weather Network*. Retrieved November 20, 2006, from http://www.weather.ca/features/firewatch/system.htm.

C3-071 Answers.com. (2006). Answers.com. Retrieved November 20, 2006, from http://www.answers.com/topic/fire-triangle.

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ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 5

EO S291.05 – CONSTRUCT IMPROVISED SHELTERS

Total Time: 160 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Visual aids and materials should be prepared prior to the start of this lesson to ensure the timings are met, to include:

- locating natural shelters; and
- constructing improvised shelters, to include:
  - a one-person poncho shelter,
  - a parachute teepee, and
  - a lean-to shelter.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TPs 1 and 2 as it allows the instructor to review factors in constructing improvised shelters while presenting background and new material.

A practical activity was chosen for TPs 3–5 as it is an interactive way to allow cadets to experience constructing improvised shelters in a safe, controlled environment. Constructing improvised shelters contributes to the development of survival skills in a fun and challenging setting.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have constructed improvised shelters.

IMPORTANCE

A properly constructed shelter will provide protection from weather, animals, insects and exposure in a survival situation. Shelters provide warmth, shade, comfort and a feeling of well-being.

Teaching Point 1 **Review Considerations for Shelter Construction**

Time: 10 min Method: Interactive Lecture

SITE SELECTION CONSIDERATIONS

- Site selection should occur 2 hours before sundown, if possible.
- The shelter should be built close to a source of water, building materials (trees, boughs) and fuel for the fire.
- The shelter should be built in an area with overhead protection from the elements.

Although trees may offer protection, those with dead branches or on windswept fields may be dangerous. Check above and around the lean-to site for dead and standing trees or branches.

LAND CONSIDERATIONS

- The area selected must be large enough to accommodate the planned shelter.
- The area selected should avoid the following:
  - the bottom of a hill or wash,
  - dry river gullies,
  - hilltops,
  - ridges,
  - canyons, and
  - flood plains.
- The area should be relatively flat with only a slight slope to allow for drainage.
- The area should be free of roots or rock outcroppings for comfort. Test the area by lying down first.

WATER CONSIDERATIONS

- The shelter should be built away from stagnant water in order to avoid insects.
- The shelter should be built 30 m away from the source of drinking water to prevent contamination.
- The shelter should be built downstream from the source of drinking water to prevent contamination.

ANIMAL AND INSECT CONSIDERATIONS

- Avoid setting up a shelter where there are animal trails or water holes.

- The shelter should be built in a breezy area to limit insects.
- Avoid areas infested with ants or bees.

OTHER CONSIDERATIONS

- There should be an area nearby to construct signals.
- The entrance of the shelter should face south/east to catch the sun, adding warmth and increasing morale.
- Avoid thick woods as it will be hard to dry the shelter and be located by search and rescuers.
- Try to find a natural windbreak or a place that is away from strong wind currents.
- Avoid swampy terrain.
- The fire should be located in front of the opening of the shelter.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. Name three land considerations when building a shelter.

Q2. Name three animal considerations when building a shelter.

Q3. Name three other considerations when building a shelter.

ANTICIPATED ANSWERS

A1. Answers will vary. Encourage the cadets to elaborate their responses and ensure the following:

- The area selected must be large enough to accommodate the planned shelter.
- The area selected should avoid the following:
  - the bottom of a hill or wash,
  - dry river gullies,
  - hilltops,
  - ridges,
  - canyons, and
  - flood plains.
- The area should be relatively flat with only a slight slope to allow for drainage.
- The area should be free of roots or rock outcroppings for comfort. Test the area by lying down first.

A2. Answers will vary. Encourage the cadets to elaborate their responses and ensure the following:

- Avoid setting up a shelter where there are animal trails or water holes.
- The shelter should be built in a breezy area to limit insects.
- Avoid areas infested with ants or bees.

A3. Answers will vary. Encourage the cadets to elaborate their responses and ensure the following:

- The entrance of the shelter should face south/east to catch the sun, adding warmth and increase morale.
- Avoid thick woods as it will be hard to dry the shelter and be located by search and rescuers.
- Try to find a natural windbreak or a place that is away from strong wind currents.
- Avoid swampy terrain.
- The fire should be located in front of the opening of the shelter.

Teaching Point 2 **Describe Shelters**

Time: 10 min Method: Interactive Lecture

Conduct a tour of actual shelters. Examples help illustrate what each shelter looks like and will provide cadets with insight into each shelter's purpose.

Have cadets inspect each shelter type.

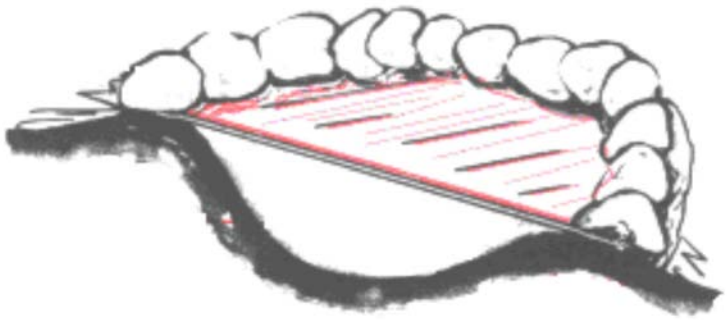
NATURAL

Tree Hollow. A tree hollow is a good natural shelter that can be used in a hurry when there is little time to construct something more permanent. It is often found under a large conifer. Lower branches hanging over the hollow may form a roof to block out the wind and rain.

K. Berger, Backpacking and Hiking, DK Publishing, Inc. (p. 203)

Figure 1-5-1 Tree Hollow

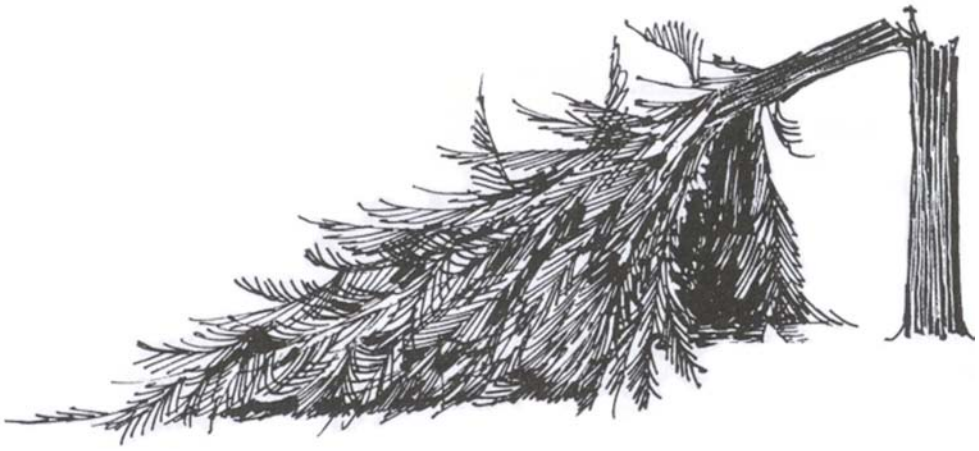
Natural Hollow. Similar to a tree hollow, a natural hallow is a shallow depression in the ground that can be covered with branches, grass, turf and bark to deflect the rain. A natural hollow while being easy to create, offers very limited protection from the elements.



P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 98)

Figure 1-5-2 Natural Hollow

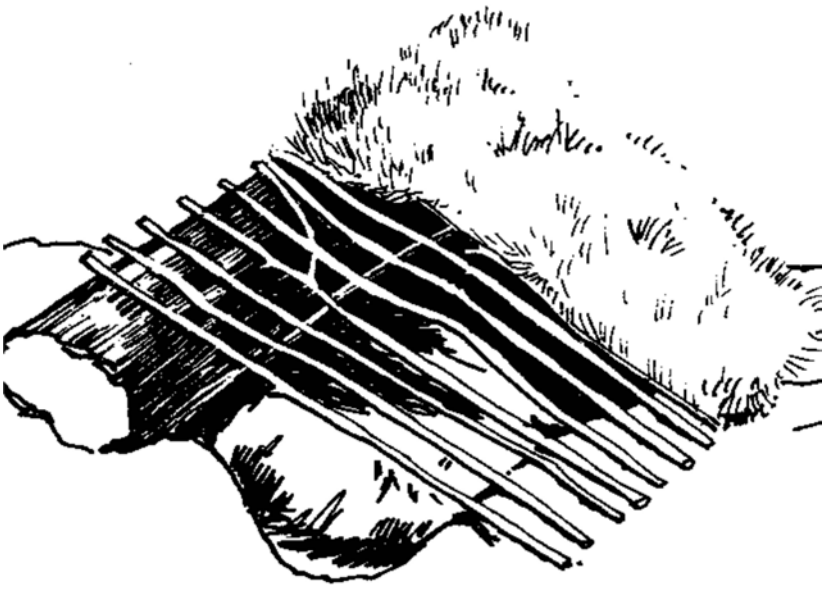
Bough Shelter. Branches that sweep low to the ground or boughs that have partly broken from the tree give basic protection from the wind, but be careful the branches are not close to breaking off completely. Cut branches from the centre of the tree, creating a hollow, then weave in other branches to make the cover more substantial. Make a similar shelter by lashing a broken-off bough to another branch where it meets the trunk of a tree.



J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 245)

Figure 1-5-3 Bough Shelter

Fallen Trunk. A log or fallen tree trunk makes a useful windbreak on its own. This shelter can be quickly prepared when time for construction is limited and can be developed into a more permanent shelter if needed. If the trunk is too small to provide protection, scoop out a hollow in the ground to increase the size of the shelter. The hollow should be opposite the wind (leeward side). A fallen trunk can make an excellent support for a lean-to as well.

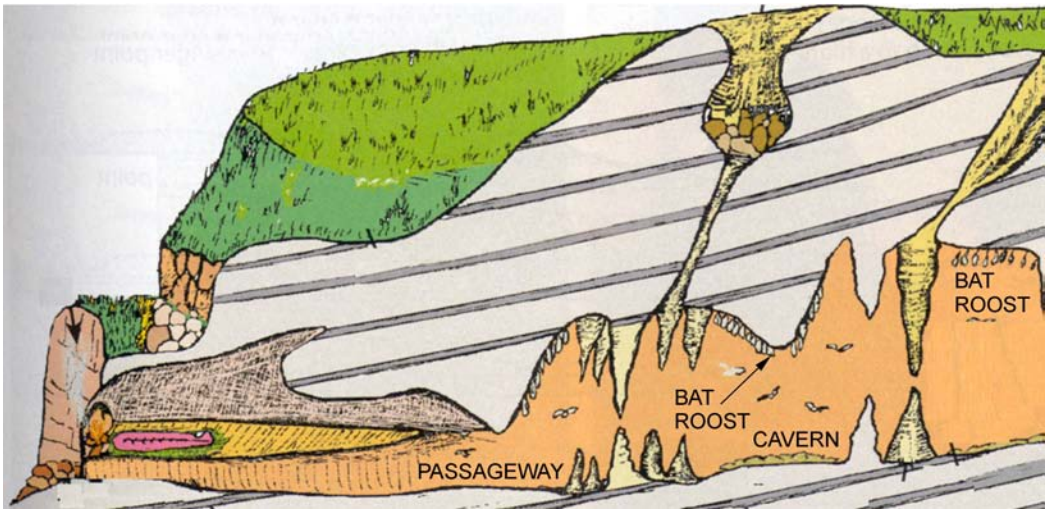


J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 245)

Figure 1-5-4 Fallen Trunk

Cave. A cave is an ideal shelter as it offers a roof, fairly consistent temperature and is secure, but can be difficult to find. Caves are found along cliffs or coast lines especially if the water levels have receded. Dangers to using a cave include:

- high tide, since caves are usually formed by wave action;
- occupants such as, snakes, bats, bears;
- there may be pitfalls;
- smoke inhalation if the fire is inside; and
- water rushing in during a storm.



P. Tawrell, Camping and Wilderness Survival, Second Edition, Leonard Paul Tawrell (p. 409)

Figure 1-5-5 Cave

Root Shelter. A root shelter will provide separation from the wind with little preparation. Use the roots for the frame, then add additional branches or boughs as a windbreak and dig into the ground to improve the shelter. Be cautious as water tends to pool at the base of the roots during rainfall.

P. Tawrell, Camping and Wilderness Survival, Second Edition, Leonard Paul Tawrell (p. 397)

Figure 1-5-6 Root Shelter

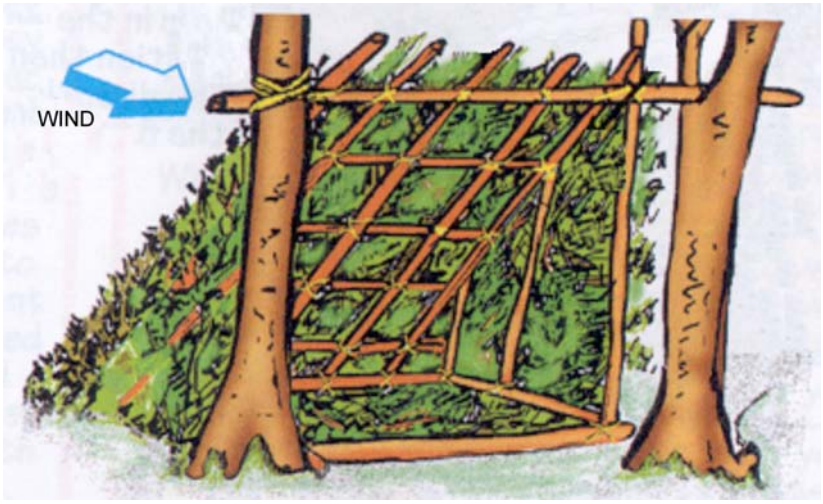
IMPROVISED

Bent Tree Shelter. Use a young sapling and slowly bend and attach it to a second tree or to the ground with a peg.

P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 99)

Figure 1-5-7 Bent Tree Shelter

Lean-to. If you are in a wooded area and have enough natural materials, you can make a lean-to without the aid of tools. This shelter will provide excellent protection from the elements. While it will take longer to make over other types, it will help prevent boredom.

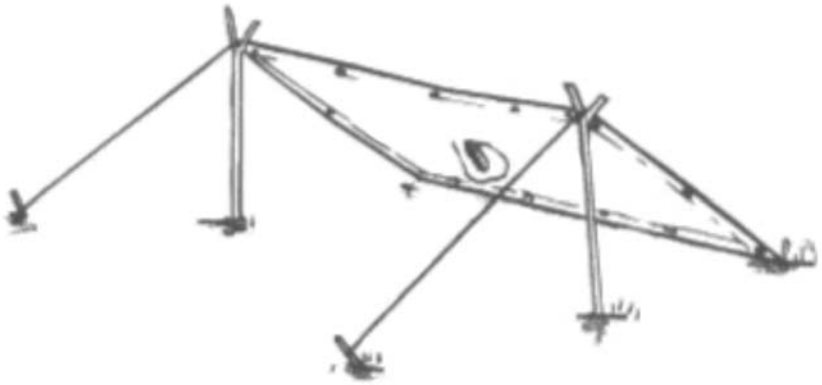


P. Tawrell, Camping and Wilderness Survival, Second Edition, Leonard Paul Tawrell (p. 457)

Figure 1-5-8 Lean-To

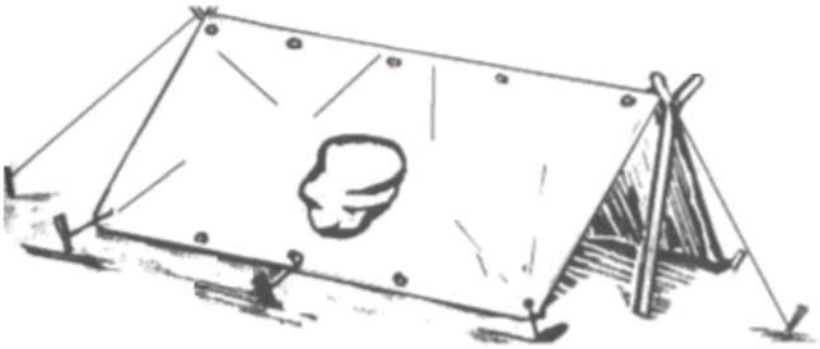
One- and Two-Person Poncho Shelter. It has a similar construction to the groundsheet shelter, but uses one or two ponchos.

A poncho is one of the most versatile items in survival. It can be used as a poncho, groundsheet, tent cover, sail on a raft or to catch rain water.



P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 99)

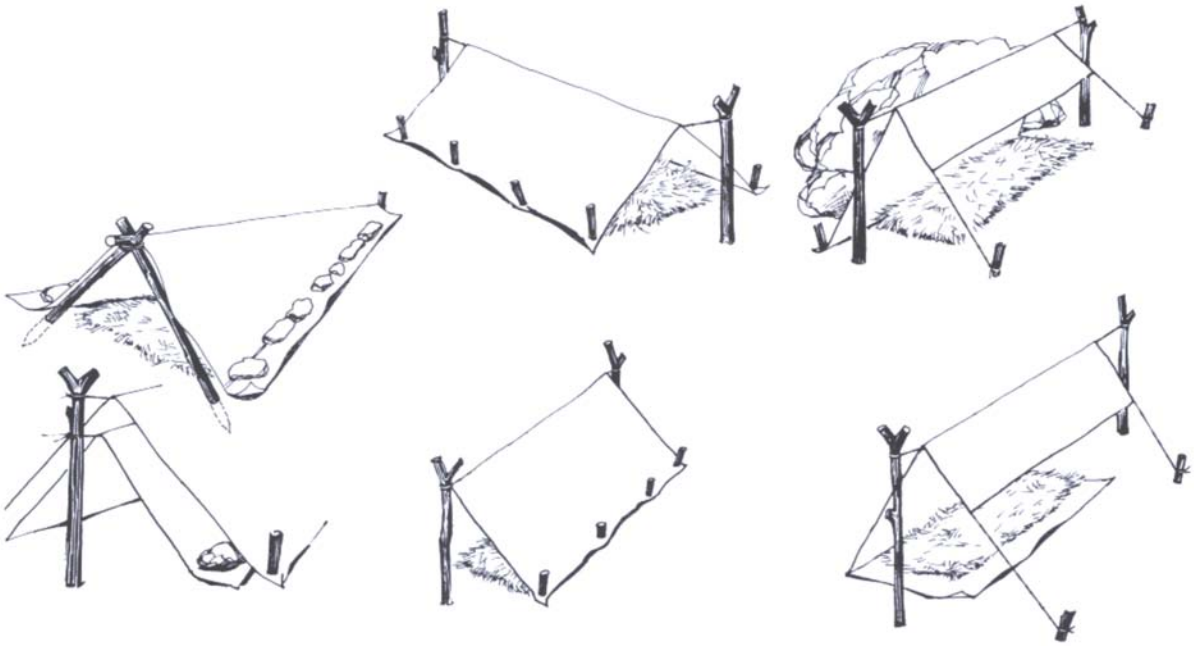
Figure 1-5-9 One-Person Poncho Shelter



P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 99)

Figure 1-5-10 Two-Person Poncho Shelter

Groundsheet Shelter. With a piece of plastic or canvas, you can quickly make several different shelters. Tying the plastic or canvas between two trees or stakes provides adequate protection from the elements.



J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 247)

Figure 1-5-11 Groundsheet Shelter

Snow Cave. A snow cave is made from snow drifts and typically provides shelter for a night or two. To construct a snow cave, dig into a firm large snowdrift, make an entry hole at the low side of the drift and dig up from the entrance to carve out a sleeping shelf. Block the entry hole with snow and poke ventilation holes in the ceiling to provide plenty of fresh air.

K. Berger, Backpacking and Hiking, DK Publishing, Inc. (p. 203)

Figure 1-5-12 Snow Cave

Teepee. Best known in its North American forms, the teepee is used in many cultures. In some situations a pilot will have access to a parachute and can make a teepee shelter very quickly. Parachute material can be used to cover a teepee frame, or can be suspended from a tree.

P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 105)

Figure 1-5-13 Teepee

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. What is good about a root shelter and how would you improve it?

Q2. What dangers should you be aware of when choosing a cave for a shelter?

Q3. What shelter would you construct given enough time and why?

ANTICIPATED ANSWERS

A1. A root shelter will provide separation from the wind with little preparation. Use the roots for the frame, then add additional branches or boughs as a windbreak and dig into the ground to improve the shelter. Be cautious as water tends to pool at the base of the roots during rainfall.

A2. Dangers to using a cave include:

- high tide, since caves are usually formed by wave action;
- occupants such as, snakes, bats, bears;
- there may be pitfalls;
- smoke inhalation if the fire is inside; and
- water rushing in during a storm.

A3. It is most favourable to construct a lean-to shelter as it will provide the most protection from the elements and comfort. As well, it will give the survivor something to do to prevent boredom.

Teaching Point 3 — **Explain and Have the Cadets, as a Member of a Group of Two, Construct a One-Person Poncho Shelter**

Time: 20 min — Method: Practical Activity

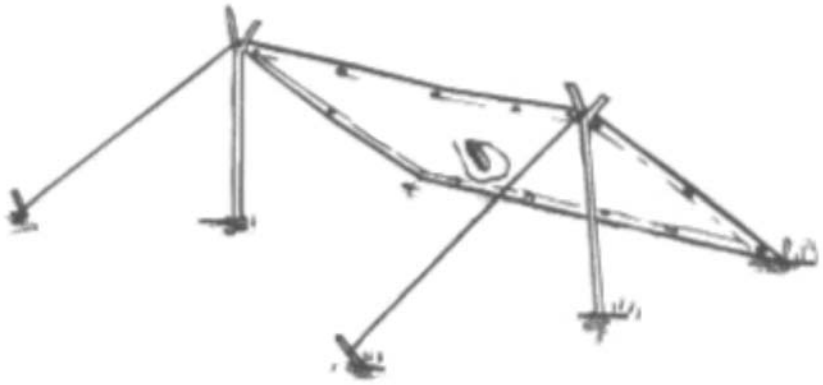
While in the field, adhere to the policies in CATO 11-08 (*Environmental Protection and Stewardship*).

Explain the steps in constructing the one-person poncho shelter that was built prior to this lesson.

The procedures for constructing a poncho shelter are:

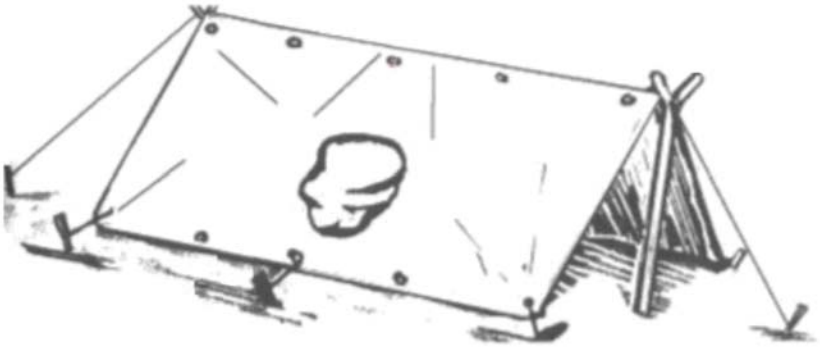
1. Select a site.
2. Collect the appropriate materials, to include:
   a. poncho,
   b. cord,
   c. knife,
   d. shovel, and
   e. natural materials.
3. Tie the poncho between two trees and ensure a 45 degree angle to effectively repel water.
4. Peg the poncho to the ground and ensure the canvas is tight.

5. Dig small trenches around the base of the shelter to allow for drainage.



P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 99)

Figure 1-5-14 One-Person Poncho Shelter



P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 99)

Figure 1-5-15 Two-Person Poncho Shelter

ACTIVITY

Time: 10 min

OBJECTIVE

The objective of this activity is to have the cadets, in pairs, construct a one-poncho shelter.

RESOURCES

- Ponchos,
- Cord,
- Knife,
- Shovel, and
- Natural materials.

ACTIVITY LAYOUT

Select an area that is large enough to construct a one-poncho shelter.

ACTIVITY INSTRUCTIONS

Working in pairs, the cadets shall choose a location for the one-poncho shelter. Each pair shall make sure they have the necessary resources to complete the shelter. Each pair shall construct a one-poncho shelter following these steps:

1. Select a site.
2. Collect the appropriate materials, to include:
   a. poncho,
   b. cord,
   c. knife,
   d. shovel, and
   e. natural materials.
3. Tie the poncho between two trees and ensure a 45 degree angle to effectively repel water.
4. Peg the poncho to the ground and ensure the canvas is tight as illustrated in Figure 1-5-14.
5. Dig small trenches around the base of the shelter to allow for drainage.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 3

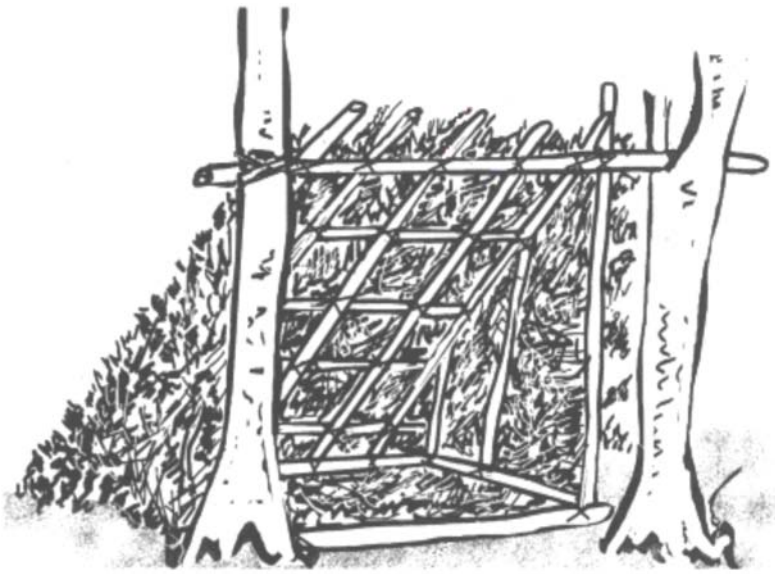
The cadets' participation in this activity will serve as the confirmation of this TP.

Teaching Point 4 — **Explain and Have the Cadets, as a Member of a Group, Construct a Natural Lean-To Shelter**

Time: 50 min — Method: Practical Activity

While in the field, adhere to the policies in CATO 11-08 (*Environmental Protection and Stewardship*).

Explain the steps in constructing the lean-to shelter that was built prior to this lesson.



P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 99)

Figure 1-5-16 Lean-To

The procedures for constructing a lean-to shelter are:

1. Select a site.
2. Collect the appropriate materials, to include:
    a. cord,
    b. knife,
    c. shovel,
    d. two trees about 2 m apart,
    e. one ridge pole about 2 m long and 2.5 cm in diameter,
    f. five to eight poles about 3 m long and 2.5 cm in diameter for beams,
    g. cord or vines for securing the horizontal support, and
    h. other poles, saplings, or vines to criss-cross the beams.
3. Tie the 2 m ridge pole to the two trees at waist to chest height. This is the horizontal support. If trees are not available, construct two tripods.
4. Place one end of the beams (3 m poles) on one side of the horizontal support. The supports should push the ridge pole against the tree, preventing too much strain on the ridge pole ties. As with all lean-to shelters, make sure to place the shelters backside into the wind. The poles should be at a 45 degree angle or more to reduce water penetration.
5. Place the remainder of five to seven (3 m poles) evenly spaced along the ridge pole and, if possible, tie them to the ridge pole to prevent them from sliding.
6. Criss-cross saplings or vines to poles to create a support.

7. Cover the framework with brush, leaves, pine needles, or grass, starting at the bottom and working your way up like shingling.

8. If possible, use as much green natural material as possible to increase the amount of water resistance. When finished there should be no visible light passing through the shelter to ensure water and wind protection.

9. Place straw, leaves, pine needles or grass inside the shelter for bedding.

Note: In cold weather, add to the lean-to's comfort level by building a fire reflector wall.

P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 99)

Figure 1-5-17 Lean-To With Firewall

ACTIVITY

Time: 35 min

OBJECTIVE

The objective of this activity is to have the cadet, as a member of a group, construct a lean-to shelter.

RESOURCES

- Two trees about 2 m apart,
- One ridge pole about 2 m long and 2.5 cm in diameter,
- Five to eight poles about 3 m long and 2.5 cm in diameter for beams,

- Cord or vines for securing horizontal support tress,
- Other poles, saplings, or vines to criss-cross the beams,
- Cord,
- Knife, and
- Shovel.

ACTIVITY LAYOUT

Select an area that is large enough to construct improvised shelters.

ACTIVITY INSTRUCTIONS

The procedures for constructing a lean-to shelter are:

1. Select a site.
2. Collect the appropriate materials, to include:
    a. cord,
    b. knife,
    c. shovel, and
    d. natural materials listed in resources.
3. Tie the 2 m ridge pole to the two trees at waist to chest height. This is the horizontal support. If a standing tree is not available, construct a bipod using Y-shaped sticks or two tripods.
4. Place one end of the beams (3 m poles) on one side of the horizontal support. The supports should push the ridge pole against the tree, preventing too much strain on the ridge pole ties. As with all lean-to shelters make sure to place the shelters backside into the wind. As well, the poles should be at a 45 degree angle or more to reduce water penetration.
5. Place the remainder of five to seven (3 m poles) evenly spaced along the ridge pole and, if possible, tie them to the ridge pole to prevent them from sliding.
6. Criss-cross saplings or vines to poles to create a support.
7. Cover the framework with brush, leaves, pine needles, or grass, starting at the bottom and working your way up like shingling as illustrated in Figure 16.
8. If possible, use as much green natural material as possible to increase the amount of water resistance. When finished there should be no visible light passing through the shelter to ensure water and wind protection.
9. Place straw, leaves, pine needles or grass inside the shelter for bedding.

Note: In cold weather, add to the lean-to's comfort level by building a fire reflector wall.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 4

The cadets' participation in this activity will serve as the confirmation of this TP.

Teaching Point 5 **Explain and Have the Cadets, as a Member of a Group, Construct a Teepee Shelter**

Time: 60 min Method: Practical Activity

While in the field you must adhere to the policies in CATO 11-08 (*Environmental Protection and Stewardship*).

Explain the steps in constructing the teepee shelter that was built prior to this lesson.

The quickest type of teepee to erect (other than suspending a parachute from a tree) has three or more angled support poles, tied where they cross to make a tripod. They can be tied on the ground and lifted into place before covering with hides, birch bark panels or sheeting. Leave an opening at the top for ventilation.

The procedures for constructing a teepee shelter are:

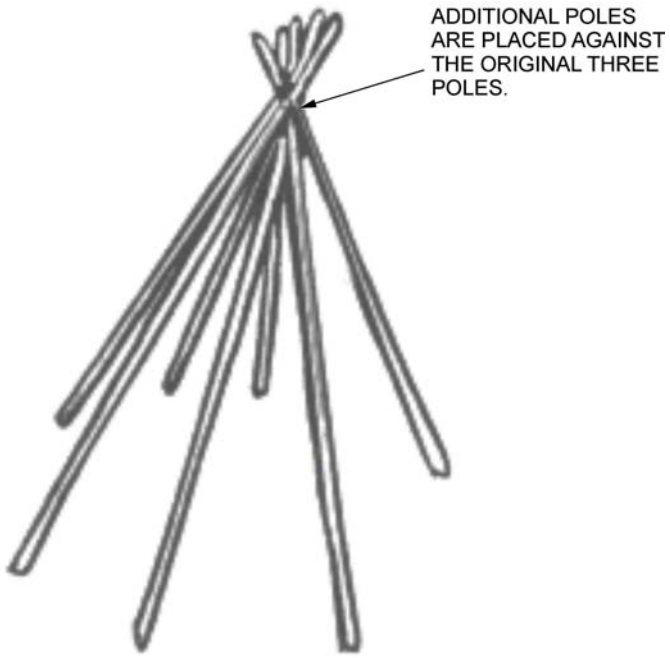
1. Select a site.
2. Collect the appropriate materials, to include:
   a. three or more poles 3–5 m long,
   b. parachute,
   c. cord,
   d. knife,
   e. shovel, and
   f. natural materials.
3. Place three poles of at least 3–5 m in length on the ground and lash them together using a figure-of-eight lashing as illustrated in Figure 1-5-18, then stand up the poles as a tripod.

D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd. (p.188)

Figure 1-5-18 Figure-of-Eight Lashing

4. Ensure these poles are strong enough to maintain a load. Avoid wood that has been lying on the ground as there is a strong chance it will be rotten and may break under strain.

5. Additional poles can be then added without lashing them. They are propped up against the tripod in order to provide a better base for attaching the parachute as illustrated in Figure 1-5-19.



P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 105)

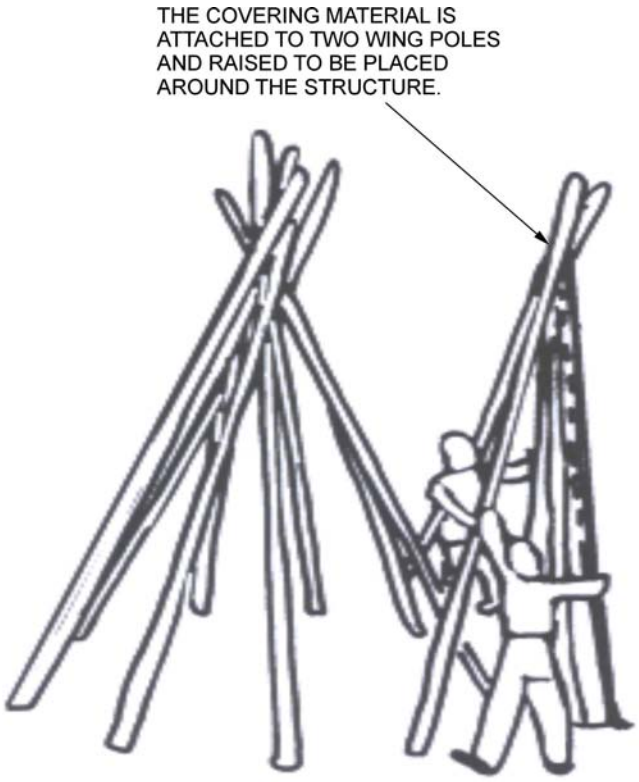
Figure 1-5-19 Add Additional Poles

6. Determine the wind direction and place the door at 90 degrees from the prevailing wind and face east, to the rising sun, if possible.

7. Lay out the parachute on the “backside” of the tripod and locate the bridle loop (nylon web loop) at the top (apex) of the parachute.

8. Fold the parachute in half or cut for a smaller teepee. For a large teepee the whole surface is used but the parachute is cut from the outside edge to the centre.

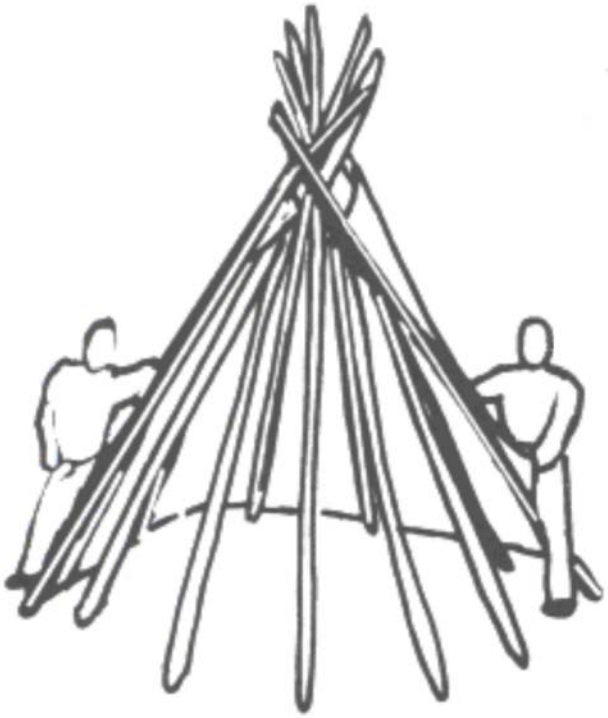
9. Attach two wing poles to the top of the parachute. Wing poles are used to raise the parachute material and drape it around the tripod. The wing poles also control the ventilation as illustrated in Figures 1-5-20, 1-5-21, 1-5-22 and 1-5-23.



P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 99)

Figure 1-5-20 Attach the Parachute

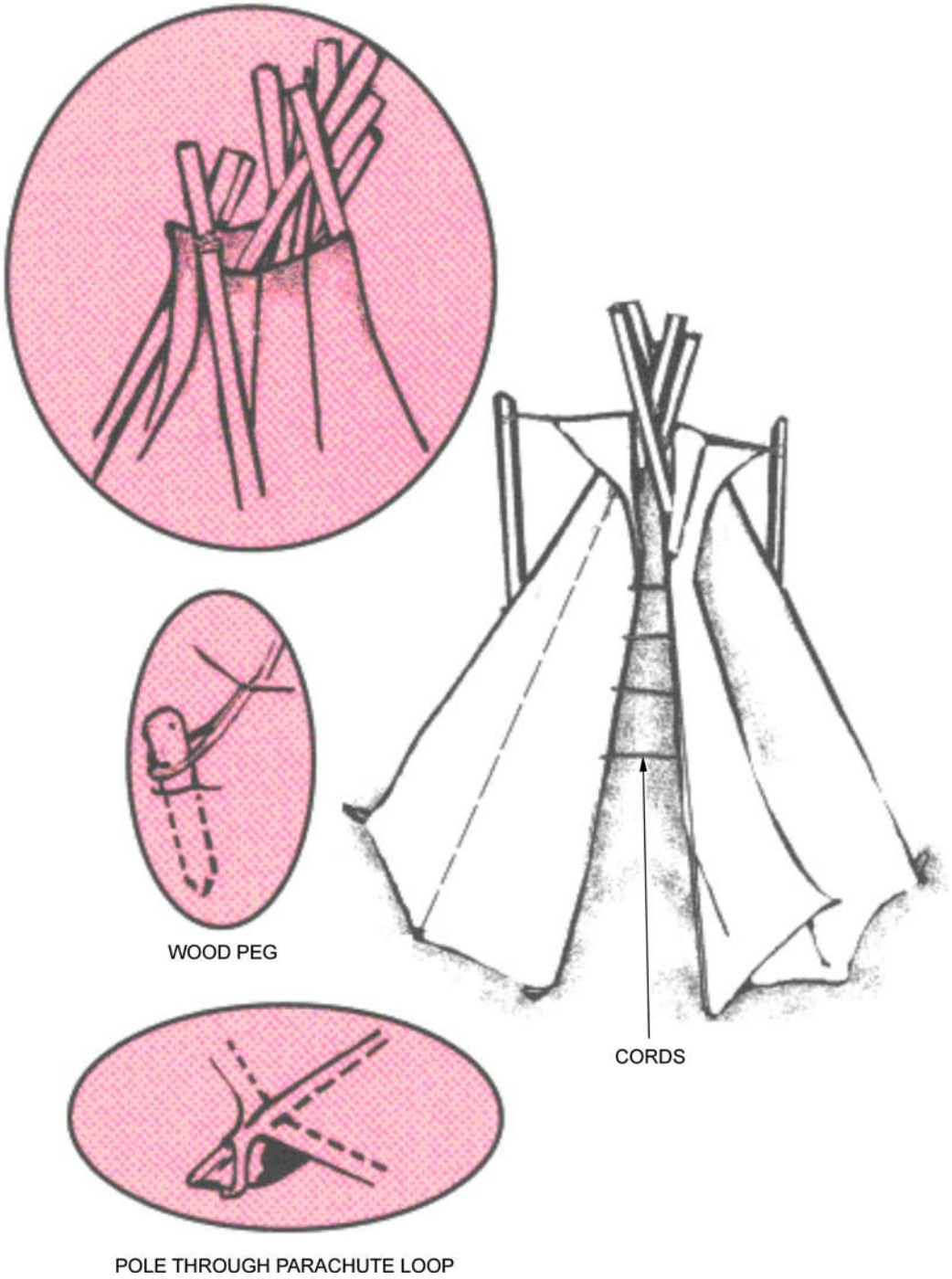
10. Wrap the parachute around the tripod as illustrated in Figure 1-5-21.



P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 99)

Figure 1-5-21 Cover the Tripod

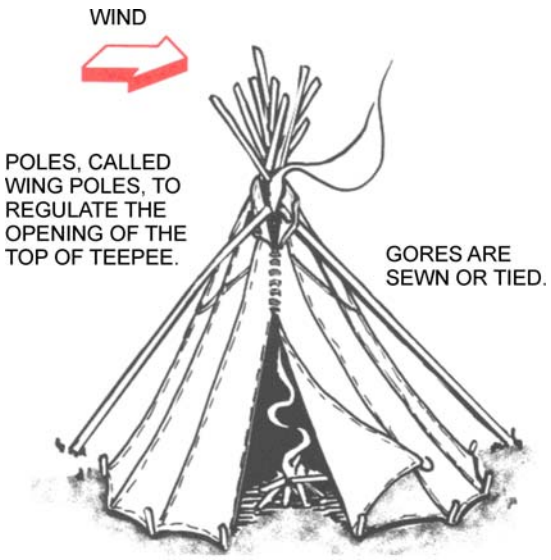
11. Construct the entrance by wrapping the folded edges of the parachute around two free standing poles. You can place the poles side by side to close the teepee entrance.



P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 99)

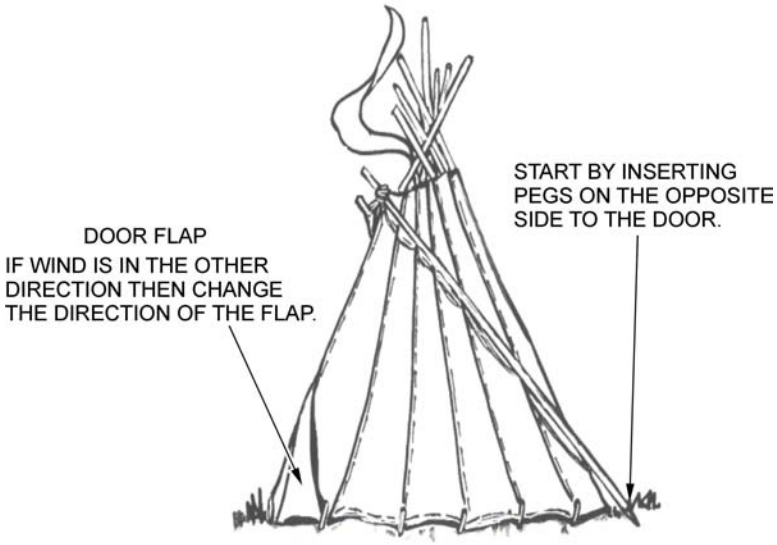
Figure 1-5-22 Tie up the Parachute

12. Place the extra parachute underneath the teepee poles and inside to create a floor for the shelter.
13. Leave a 30–50 cm opening at the top for ventilation if you intend to have a fire inside the teepee.



P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 99)

Figure 1-5-23 Completed Teepee from the Front


START BY INSERTING PEGS ON THE OPPOSITE SIDE TO THE DOOR.
DOOR FLAP
IF WIND IS IN THE OTHER DIRECTION THEN CHANGE THE DIRECTION OF THE FLAP.

P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 99)

Figure 1-5-24 Completed Teepee from the Side

ACTIVITY

Time: 45 min

OBJECTIVE

The objective of this activity is to have the cadet, as a member of a group, construct a teepee.

RESOURCES

- Three or more poles 3–5 m long,

- Cord,
- Parachute,
- Knife, and
- Shovel.

ACTIVITY LAYOUT

Select an area that is large enough to construct improvised shelters.

ACTIVITY INSTRUCTIONS

The procedures for constructing a teepee are to include:

1. Select a site.
2. Collect the appropriate materials, to include:
    a. three or more poles 3–5 m long,
    b. parachute,
    c. cord,
    d. knife,
    e. shovel, and
    f. natural materials.
3. Place three poles of at least 3–5 m in length on the ground and lash them together using a figure-of-eight lashing as illustrated in Figure 1-5-18, then stand up the poles as a tripod.
4. Ensure these poles are strong enough to maintain a load. Avoid wood that has been lying on the ground as there is a strong chance it will be rotten and may break under strain.
5. Additional poles can be then added without lashing them. They are propped up against the tripod in order to provide a better base for attaching the parachute as illustrated in Figure 1-5-19.
6. Determine the wind direction and place the door at 90 degrees from the prevailing wind and face east, to the rising sun, if possible.
7. Lay out the parachute on the “backside” of the tripod and locate the bridle loop (nylon web loop) at the top (apex) of the parachute.
8. Fold the parachute in half or cut for a smaller teepee. For a large teepee the whole surface is used but the parachute is cut from the outside edge to the centre.
9. Attach two wing poles to the top of the parachute. Wing poles are used to raise the parachute material and drape it around the tripod. The wing poles also control the ventilation as illustrated in Figures 1-5-20, 1-5-21, 1-5-22 and 1-5-23.
10. Wrap the parachute around the tripod as illustrated in Figure 1-5-21.
11. Construct the entrance by wrapping the folded edges of the parachute around two free standing poles. You can place the poles side by side to close the teepee entrance as illustrated in Figure 1-5-22.
12. Place the extra parachute underneath the teepee poles and inside to create a floor for the shelter.

13. Leave a 30–50 cm opening at the top for ventilation if you intend to have a fire inside the teepee.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 5

The cadets' participation in this activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' construction of a one-poncho, lean-to and teepee shelter will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-826/PG-001, Chapter 3, Annex B, Appendix 1 (PC S291).

CLOSING STATEMENT

It is important for the cadets to know how to construct improvised shelters in a survival situation. A properly constructed shelter will provide protection from weather, animals, insects and exposure. Shelters provide warmth, shade, comfort and a feeling of well-being.

INSTRUCTOR NOTES/REMARKS

If natural materials cannot be collected or used in TP 4 a groundsheet shall be substituted.

Prior to conducting this lesson the instructor shall locate examples of each type of natural shelter and have prepared the necessary improvised shelters.

It is understood that seasonal differences and location may restrict the ability to identify all shelters mentioned; however, the cadet should be provided with as many visual examples as possible.

The directives found in CATO 11-08 (*Environmental Protection and Stewardship*) are to be followed during this lesson.

If local conditions and regulations allow, use natural materials to construct the shelter for demonstration. If local conditions and regulations do not allow for use of natural materials, substitute natural materials with a groundsheet for performance.

REFERENCES

C3-002 (ISBN 0-00-653140-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.

C3-003 (ISBN 1-896713-00-9) Tawrell, P. (1996). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Paul Tawrell.

C3-118 Wilderness Survival. (2007). *Shelters*. Retrieved March 9, 2007, from http://www.wilderness-survival.net/shelters-2.php.

ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 6

EO S291.06 – CONSTRUCT A SIGNAL FIRE

Total Time: 40 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

A luminous cone fire should be built as an example prior to delivering the lesson.

Review CSTC policies on the use of natural resources (eg, live trees, deadfall, rocks, digging up the ground).

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TPs 1 and 2 to present basic material and give direction on signal fires.

Demonstration and performance was chosen for TP 3 as it allows the instructor to explain and demonstrate constructing a signal fire while providing an opportunity for the cadets to practice this skill under supervision.

INTRODUCTION

REVIEW

The review for this lesson is of EO M290.01 (Construct, Light, Maintain and Extinguish a Signal Fire, A-CR-CCP-802/PF-001, *Royal Canadian Air Cadets, Level Two – Instructional Guides*, Chapter 16, Section 1).

OBJECTIVES

By the end of this lesson the cadet shall have constructed a signal fire.

IMPORTANCE

It is important for cadets to safely construct a signal fire as it will alert rescuers to their location if they become lost or injured.

Teaching Point 1 **Review Types of Signal Fires That Will Attract Rescue Aircraft**

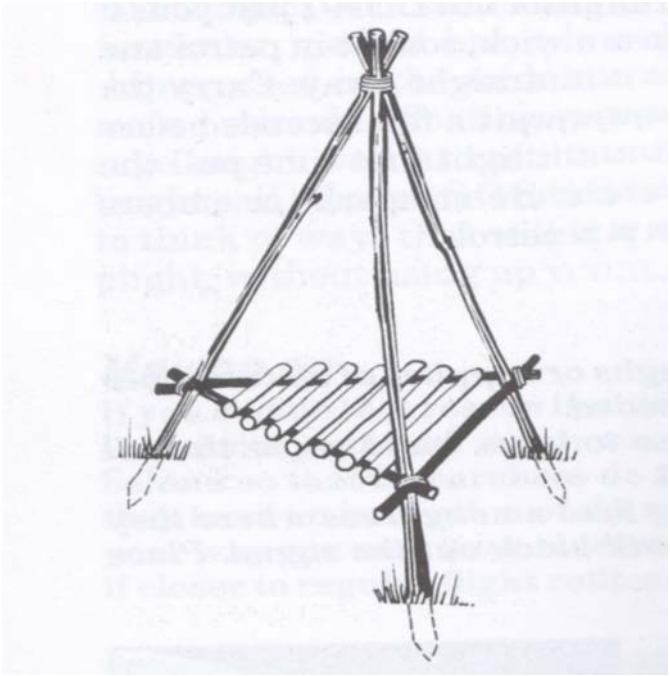
Time: 5 min Method: Interactive Lecture

SIGNAL FIRES

Three-Fire Triangle Pattern. The three-fire triangle pattern is an internationally recognized distress signal. It is three small fires, placed in the shape of a triangle at equal distances apart. This arrangement makes them easier to feed with fuel.

A Torch Tree. Small isolated trees make excellent fire signals. A torch tree is a signal fire that is built between the boughs. Dried wood placed in the lower branches are ignited so that the flames flare up and ignite the foliage. A torch tree will burn for a long time, leaving one free to attend to other signals.

A Luminous Cone Fire. A luminous cone fire is a tripod with a platform to support a fire. The poles are driven/dug into the ground to prevent the tripod from tipping over in the wind. The platform keeps the tinder off damp ground and stores more firewood beneath it. It is covered with evergreen boughs to keep the cone dry and will also burn brightly and give off smoke. The cone is usually covered with brightly-coloured material when the fire is not lit. It not only will keep the fire dry and ready to burn, but the material itself will be noticeable during the day. The bright-coloured material is taken off when ignited.



J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 506)

Figure 1-6-1 A Luminous Cone Fire

Have cadets examine the luminous cone fire built prior to the lesson. Ask if they have any questions. If their are questions, review the steps to build:

1. Collect materials: tinder, kindling, fuel and wood for poles and platform.
2. Make a tripod to support a fire.
3. Using the cord, lash the top of the tripod together and the side supports together.
4. Ensure pole ends are driven into the ground to prevent tipping.
5. Make a platform to hold the tinder, kindling and fuel.
6. Place tinder and kindling in the centre of the platform.
7. Ensure tinder and kindling are placed together to ignite the cone.
8. Ensure there is sufficient ventilation around the tinder and kindling for air to reach a fire.
9. Cover with green boughs (if available) to keep the cone dry.
10. Ensure there is a heat and smoke outlet at the top of the cone.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. Name three types of signal fires.

Q2. Three fires grouped together signal what message?

Q3. For a luminous cone fire, why do you drive the poles into the ground?

ANTICIPATED ANSWERS

A1. A three-fire triangle pattern, a torch tree, and a luminous cone fire.

A2. The internationally recognized distress signal.

A3. The poles of a luminous cone fire are driven into the ground so that it will not fall over in strong winds.

Teaching Point 2 **Identify a Location That Can be Seen From the Air**

Time: 5 min Method: Interactive Lecture

LOCATIONS FOR A SIGNAL FIRE WHICH CAN BE SEEN FROM THE AIR

Highly Visible. A highly visible location is a natural clearing or edge of a stream where one can build fires where the foliage will not be hidden.

Elevated Ground. Elevated ground is the highest point of terrain with clear lines-of-sight in several directions, to light a signal fire.

Fuel Source. Being in an area where there are readily available fuel sources for the signal fire would be highly beneficial. Some examples of fuel sources include:

- dry, standing wood, and dry, dead branches,
- dry inside (heart) of fallen tree trunks and branches,

- green wood that is finely split,
- dry grasses twisted into bunches,
- peat dry enough to burn,
- dried animal dung,
- animal fats,
- coal, oil shale, or oil laying on the surface, and
- rubber, plastic or heavy oil to produce thick black smoke.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. Name three locations in which to place a signal fire.

Q2. What is meant by a highly visible location?

Q3. Name five examples of fuel sources.

ANTICIPATED ANSWERS

A1. Highly visible, on elevated ground, and near a fuel source.

A2. A highly visible location would be a natural clearing or the edge of a stream where you can build fires where the foliage will not be hidden.

A3. Examples of fuel sources include:

- dry, standing wood, and dry, dead branches,
- dry inside (heart) of fallen tree trunks and branches,
- green wood that is finely split,
- dry grasses twisted into bunches,
- peat dry enough to burn,
- dried animal dung,
- animal fats,
- coal, oil shale, or oil laying on the surface, and
- rubber, plastic or heavy oil to produce thick black smoke.

Teaching Point 3 **Demonstrate and Have the Cadets Construct a Signal Fire**

Time: 25 min Method: Demonstration and Performance

The following material is a review of EO M290.01 (Construct, Light, Maintain and Extinguish a Signal Fire, A-CR-CCP-802/PF-001, Chapter 16, Section 1).

Divide cadets into groups of no more than 10.

It is not necessary during the lesson to light a signal fire.

COLLECTING AND PREPARING COMBUSTIBLE MATERIALS

Tinder. Tinder is any kind of material that a minimum amount of heat will ignite. Good tinder needs only a spark to set it ablaze. Birch bark, dry grass, fine wood shavings, bird down, bird nest, waxed paper and cotton fluff from clothing all make good tinder. Tinder must be dry.

Kindling. Kindling is the wood used to raise flames from the tinder so larger, less combustible materials can be burned. The best kindling consists of small, dry twigs and small pieces of soft wood. Kindling should not be collected straight from the earth because it will usually be damp. It should be gathered from standing deadwood.

Fuel. Fuel is anything that will burn in the fire. Dry wood from standing trees should be used to get fires going. Once the fire is established, greener and damp wood may be used. Hardwoods include hickory, beech, maple and oak. These hardwoods burn well, give off heat, and last as long as hot coals. The fire can be maintained for a long period of time using hardwoods. Softwoods burn very quickly and give off sparks. They can be used when lighting the fire. Softwoods include cedar, alder, hemlock, spruce, pine, chestnut and willow. After the fire is burning steadily, fuel that is three to four times the size of the kindling can be added.

ACTIVITY

Time: 20 min

OBJECTIVE

The objective of this activity is to construct and disassemble a luminous cone fire.

RESOURCES

- Axe,
- Cord,
- Shovel,
- Wood,
- Boughs,
- Tinder, and
- Kindling.

ACTIVITY LAYOUT

The area should be in an open space.

ACTIVITY INSTRUCTIONS

1. Have the cadets collect materials: tinder, kindling, fuel and wood for poles and platform.
2. Have the cadets make a tripod to support a fire.
3. Have the cadets using the cord, lash the top of the tripod together and the side supports together.
4. Have the cadets ensure pole ends are driven into the ground to prevent tipping.
5. Have the cadets make a platform to hold the tinder, kindling and fuel.
6. Have the cadets place tinder and kindling in the centre of the platform.
7. Have the cadets ensure tinder and kindling are placed together to ignite the cone.
8. Have the cadets ensure there is sufficient ventilation around the tinder and kindling for air to reach a fire.
9. Have the cadets cover with green boughs (if available) to keep the cone dry.
10. Have the cadets ensure there is a heat and smoke outlet at the top of the cone.
11. Have the cadets disassemble the signal fire when instructed.
12. Have the cadets return all natural resources to the environment (low environmental impact).

Comment on each signal fire before moving from one group to the next.

SAFETY

- Cadets will be supervised during the construction of a luminous cone fire.
- Tool use shall be IAW EO S292.07 (Use Tools, Chapter 2, Section 7).

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in constructing a luminous cone fire will serve as confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in constructing a luminous cone fire will serve as confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-826/PG-001, Chapter 3, Annex B, Appendix 1 (PC S291).

CLOSING STATEMENT

In a survival situation, the goal is to be found. Constructing a signal fire is one of the most effective ways of being noticed and rescued. While we have taken care to minimize our effect on the environment, in a real survival situation, do what is necessary to survive, including the cutting and use of the branches of live trees.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

C2-016 (ISBN 0-517-88783-5) Curtis, R. (1998). *The Backpacker's Field Manual: A Comprehensive Guide to Mastering Backcountry Skills*. New York, NY: Three Rivers Press.

C2-042 (ISBN 0-7566-0946-1) Berger, K. (2005). *Backpacking & Hiking*. New York, NY: DK Publishing, Inc.

C3-002 (ISBN 0-00-653140-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.

C3-118 Wilderness Survival. (2007). *Signalling Techniques*. Retrieved March 12, 2007, from http://www.wilderness-survival.net/chpt19.php.

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ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 7

EO S291.07 – CONSTRUCT A GROUND-TO-AIR SIGNAL

Total Time:	40 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Photocopy the handout located at Annex B for each cadet.

One ground-to-air signal is to be built for demonstration purposes prior to delivering the lesson.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TP 1 to review ground-to-air signals.

A practical activity was chosen for TPs 2 and 3 as it is an interactive way to allow the cadet to construct and disassemble ground-to-air signals. This activity contributes to the development of the skills and knowledge in a fun and challenging setting.

INTRODUCTION

REVIEW

The review for this lesson is of EO M290.04 (Construct Ground-to-Air Signals, A-CR-CCP-802/PF-001, Chapter 16, Section 4).

OBJECTIVES

By the end of this lesson the cadet shall have constructed a ground-to-air signal.

IMPORTANCE

It is important for cadets to know how to construct ground-to-air signals as they may help them get rescued in a survival situation. Ground-to-air signals are internationally recognized and can be made with almost any substance; in the snow, with logs, with rocks, or by trampling grass. The purpose of ground-to-air signals is to be located, noticed, or to convey a message to rescuers.

Teaching Point 1 **Review Ground-to-Air Signals**

Time: 5 min Method: Interactive Lecture

The ground-to-air signals handout located at Annex B should be given to the cadets at this time.

Have the cadets examine the ground-to-air signal constructed prior to the lesson. When reviewing the characteristics, illustrate them with the example of the ground-to-air signal.

CHARACTERISTICS

Signal Dimensions

Symbols should be at least 8 feet in length or longer, if possible. Care should be taken to lay out symbols exactly as depicted to avoid confusion with other symbols.

When it comes to ground-to-air signals, bigger is better.

The elements of the “all is well” signal should be separated by 10 feet.

Creating Contrasting Shades or Colours

Ground-to-air signals should be constructed using contrasting shades or colours in order to make them more visible.

TYPES

There are many types of ground-to-air signal messages; however, only five will be examined, to include:

Require Assistance. A capital letter “V”.

Require Medical Assistance. A capital letter “X”.

Proceeding in This Direction. An arrow pointing in the direction one is proceeding in.

All Is Well. Capital letter “L”s spaced 10 feet apart.

Require Food and Water. A capital letter “F”.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. How can you make ground-to-air signals more visible?

Q2. How large should you make ground-to-air signals?

Q3. What is the ground-to-air signal for require assistance?

ANTICIPATED ANSWERS

A1. By using contrasting shades or colours.

A2. The symbols should be at least 8 feet in length or longer.

A3. A capital letter “V”.

Teaching Point 2 **As a Member of a Group of no More Than Four, Have the Cadet Construct One of the Ground-to-Air Signals**

Time: 20 min Method: Practical Activity

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets, as a member of a group, construct a ground-to-air signal.

RESOURCES

- Handout of ground-to-air signals,
- Axe,
- Shovel,
- Cord, and
- Natural resources (eg, deadfall, rocks, sand).

ACTIVITY LAYOUT

A large open area where all the groups can construct a ground-to-air signal.

ACTIVITY INSTRUCTIONS

1. Divide cadets into groups of four.
2. Distribute given materials to the groups.
3. Assign a ground-to-air signal to each group.
4. The cadets shall choose a location for their ground-to-air signal. If the cadets have access to beaches or fields they may use the area accordingly (eg, drawing signals in the sand).
5. Have groups gather resources needed for signals.
6. Each group shall construct one ground-to-air signal.
7. Ensure that the final constructed signal looks the same as the picture provided on the handout.

SAFETY

- Ensure cadets stay within the boundary areas.
- Tool use shall be IAW EO S292.07 (Use Tools, Chapter 2, Section 7).

CONFIRMATION OF TEACHING POINT 2

The cadets' participation in constructing a ground-to-air signal will serve as confirmation of this TP.

Teaching Point 3 **Discuss and Disassemble Ground-to-Air Signals**

Time: 10 min Method: Practical Activity

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets disassemble the ground-to-air signals. The cadets need to understand the reasons why a ground-to-air signal needs to be disassembled.

RESOURCES

Shovel.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

1. Gather all the groups together.
2. Begin a discussion by asking the question: "Why should a ground-to-air signal be disassembled after you have been rescued?" Key points of the discussion:
   - The emergency message of the ground-to-air signal is being communicated to passing aircraft for as long as it exists.
   - IAW the principles of environmental stewardship, cadets shall return the area to as near its original condition to have as little impact on the environment as possible.
3. Send the groups back to their ground-to-air to disassemble it.
4. Have the cadets return natural resources back to the environment.

SAFETY

Tool use shall be IAW EO S292.07 (Use Tools, Chapter 2, Section 7).

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in disassembling a ground-to-air signal will serve as confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in constructing and disassembling a ground-to-air signal will serve as confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-826/PG-001, Chapter 3, Annex B, Appendix 1 (PC S291).

CLOSING STATEMENT

Ground-to-air signals are internationally recognized and can greatly increase your chances of being rescued. Also, while we have taken care to minimize our effect on the environment, in a real survival situation, one must do what is necessary to survive, including cutting down live trees if needed to construct your ground-to-air signals.

INSTRUCTOR NOTES/REMARKS

All materials used in the construction of ground-to-air signals will be from the surrounding environment.

All ground-to-air signals shall be disassembled and the natural resources returned to the environment after completion.

This lesson shall be taught after EO S292.07 (Use Tools, Chapter 2, Section 7).

REFERENCES

C2-044 Transport Canada. (2007). *Ground-to-Air Signals*. Retrieved February 9, 2007, from http://www.tc.gc.ca/CivilAviation/publications/tp14371/SAS/4-0.htm.

C3-003 (ISBN 1-896713-00-9) Tawrell, P. (1996). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Paul Tawrell.

C3-118 Wilderness Survival. (2007). *Signalling Techniques*. Retrieved March 12, 2007, from http://www.wilderness-survival.net/chp19.php.

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ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 8

EO S291.08 – COLLECT AND PURIFY WATER

Total Time: 80 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Find a suitable water collection area for construction of the solar still. Ensure the area has enough ground coverage for all groups to have space to construct their solar stills. Build a solar still for the demonstration in TP 4.

Build a distillation kit before the start of the class.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TPs 1, 2, and 5 to present basic material and give direction on procedures.

Demonstration was chosen for TPs 3, 4, and 7 as it allows the instructor to explain and demonstrate collecting water from condensation, constructing a solar still, and distilling water using an improvised distillation kit.

Performance was chosen for TPs 6 and 9 as it provides an opportunity for the cadet to practice building and disassembling a solar still under supervision.

Demonstration and performance was chosen for TP 8 as it allows the instructor to explain and demonstrate the skill the cadet is expected to acquire while providing an opportunity for the cadets to practice purifying water under supervision.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall be expected to collect and purify water.

IMPORTANCE

It is important for the cadets to understand the importance of how to collect and purify water in a survival situation as it may not be readily available. The cadets will have to use other resources to find water. Thirst is one of the seven enemies of survival.

Teaching Point 1 **Explain How to Retain Fluids and the Importance of Water Conservation in a Survival Situation**

Time: 5 min Method: Interactive Lecture

The average person loses two to three litres of water each day—even resting in the shade loses about one litre. Breathing also loses fluids, as well as perspiration which increases with work rate and temperature. Vomiting and diarrhea increases loss further. Water must be replaced to preserve the critical balance.

HOW TO RETAIN FLUIDS

Rest

Avoid exertion. Just rest.

Do Not Smoke

Smoking pulls moisture from the body.

Stay Cool

Keep cool. Stay in the shade. If there is none, erect a cover to provide it. Do not lie on hot ground or heated surfaces.

Do Not Eat

Do not eat, or eat as little as possible. If there is no water available fluid will be taken from the vital organs to digest food, further increasing dehydration. Fat is hardest to digest and takes a lot of fluid to break it down.

Do Not Drink Alcohol

Never drink alcohol. This also takes fluid away from vital organs to break it down.

Do Not Talk

Do not talk—and breathe through the nose, not the mouth.

THE IMPORTANCE OF WATER CONSERVATION

The average person can survive for three weeks without food but only for three days without water. Do not wait until water is gone before looking for a source. Conserve what is there and seek a source as soon as possible. Fresh running water is preferred; however, all water can be sterilized by boiling or using chemical purifiers.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. How much water does the average person lose a day?

Q2. How can a person retain fluids?

Q3. What type of water is preferred?

ANTICIPATED ANSWERS

A1. The average person loses two to three litres a day.

A2. Resting, staying cool, lying on cool surfaces, eating very little and breathing through the nose.

A3. Fresh running water.

Teaching Point 2 **Explain How to Find Water**

Time: 5 min Method: Interactive Lecture

OBSERVE ANIMALS

When in a survival situation, observing the behaviour of animals is the best indicator of where to locate sources of water. Other sources of water can also come from the following:

Mammals

Most mammals require water regularly. Grazing mammals are usually never far from water. Converging game trails often lead to water; follow them downhill.

Birds

Grain eaters, such as finches and pigeons are never far from water. They drink at dawn and dusk. When they fly straight and low, they are heading for water. When they return from water they fly from tree to tree, resting frequently. By plotting their direction, water can be found.

Water birds can travel long distances without stopping to feed or drink; they do not necessarily indicate water nearby.

Hawks, eagles and other birds of prey draw water from their victims and cannot be taken as a sign that water is nearby.

Reptiles

Reptiles are not an indicator of water. They collect dew and draw moisture from prey.

Insects

Insects are good indicators of water; especially bees. Bees fly a maximum of 6.5 km from their nests or hives. They do not have regular watering times.

Ants are dependant upon water. A column of ants marching up a tree is going to a small reservoir of trapped water.

Most flies keep within 90 m (100 yards) of water.

SEARCH FOR PLANTS

Look for green leaf plants and trees that require a lot of water. These plants include cattails, bulrush, elderberries, and reeds. Trees include cottonwood, poplars, greasewood, and willows. This type of growth indicates a high water table and these plants could be located on a dry river bed. To get to the water, dig into the ground one or two feet and water will accumulate in this pit.

An alternate place to search for water is at a base of cliffs where there is vegetation.

SEARCH IN VALLEY BOTTOMS

Look in valley bottoms where water naturally drains. If there is no obvious stream or pool, look for patches of green vegetation and dig there. There may be water just below the surface which will collect in the hole. Even digging in gullies and dry stream beds may reveal a spring beneath the surface, especially in gravely areas. In the mountains, look for water trapped in crevices.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. What type of birds do not necessarily indicate that there is water nearby?

Q2. What are the best indicators of water?

Q3. What types of plants should you look for that require large amounts of water?

ANTICIPATED ANSWERS

A1. Water birds can travel long distances without stopping to feed or drink so they do not necessarily indicate water nearby. Hawks, eagles and other birds of prey get water from their victims and cannot be taken as a sign that local water is nearby.

A2. Animals.

A3. Look for green leaf plants and trees that require a lot of water. These plants include cattails, bulrush, elderberries, and reeds. Trees include cottonwood, poplars, greasewood, and willows.

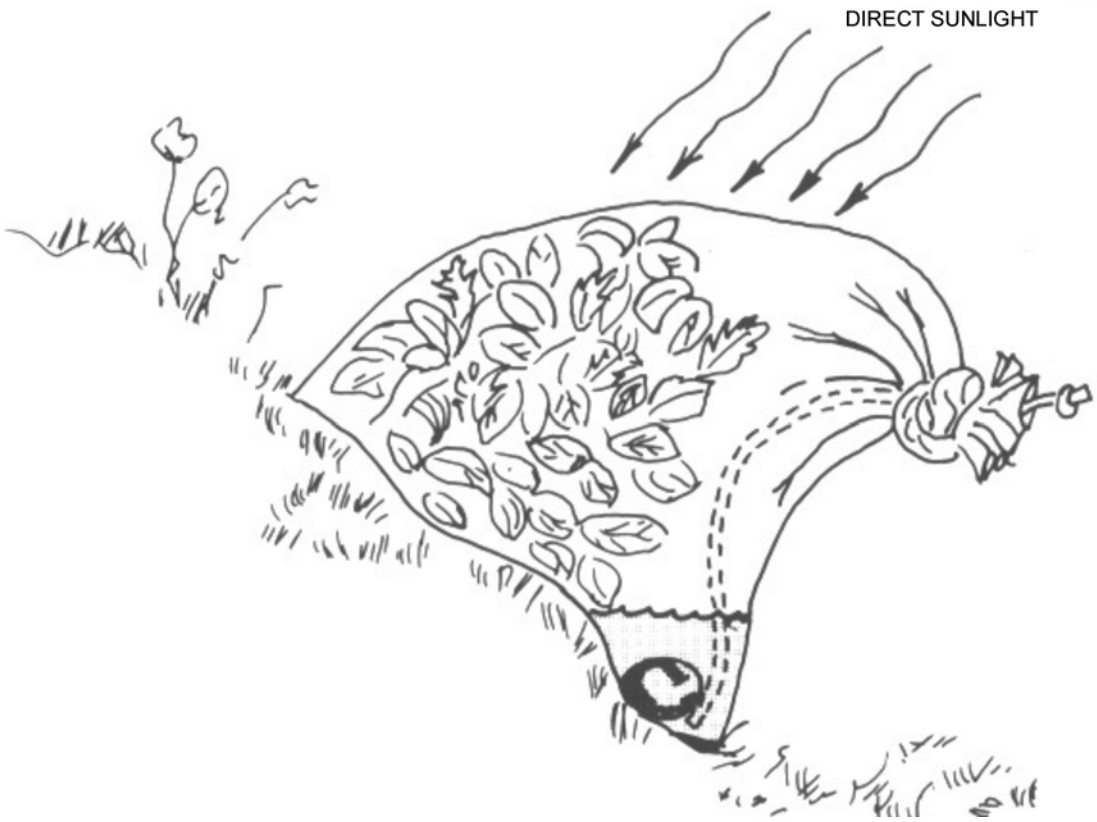
Teaching Point 3 **Demonstrate Collecting Water From Condensation**

Time: 10 min Method: Demonstration

VEGETATION BAG

To construct a vegetation bag, one will need a clear plastic bag and an ample supply of healthy, non-poisonous vegetation. A four to six-foot section of surgical tubing is also helpful.

1. Open the plastic bag and fill it with air.
2. Fill the bag one-half to three-quarters full with lush green vegetation. Be careful not to puncture the bag.
3. Place a small rock or similar item into the bag. If you have surgical tubing, slide one end inside and toward the bottom of the bag. Tie the other end with an overhand knot.
4. Tie off the bag as close to the opening as possible.
5. Place the bag on a sunny slope so that the opening is slightly higher than the bag's lowest point.
6. Position the rock and surgical tubing at the lowest point in the bag.
7. For best results, change the vegetation every two to three days.
8. If using surgical tubing, simply untie the knot and drink the water that has condensed in the bag. If no tubing is used, loosen the tie and drain off available liquid. Be sure to drain off all liquid prior to sunset each day, or it will be reabsorbed by the vegetation.



G. Davenport, Wilderness Survival, Stackpole Books (p. 144)

Figure 1-8-1 Vegetation Bag

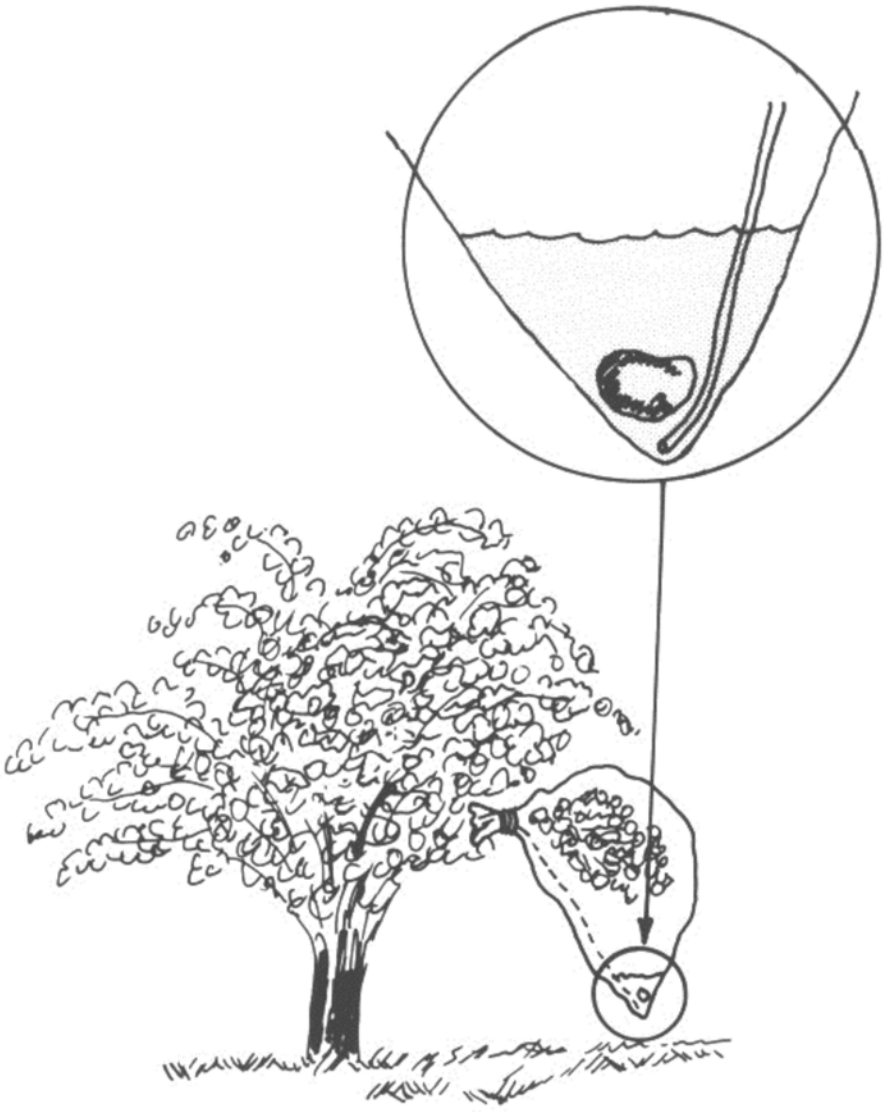
TRANSPIRATION BAG

A transpiration bag is better than a vegetation bag because the same vegetation can be reused after allowing enough time for it to rejuvenate.

To construct a transpiration bag, one will need a clear plastic bag and a non-poisonous bush or tree.

A four to six-foot section of surgical tubing is also helpful.

1. Open the plastic bag and fill it with air.
2. Place the bag over the lush leafy vegetation of a tree or bush, being careful not to puncture the bag. Be sure the bag is on the side of the tree or bush with the greatest exposure to the sun.
3. Place a small rock or similar item into the bag's lowest point, and if you have surgical tubing, place one end at the bottom of the bag next to the rock.
4. Tie the other end of the tubing with an overhand knot.
5. Tie off the bag as close to the opening as possible.
6. Change the bag's location every two to three days to ensure optimal outcome and to allow the previous site to rejuvenate so it might be used again later.
7. If using surgical tubing, simply untie the knot and drink the water that has condensed in the bag. Be sure to drain off all liquid prior to sunset each day, or it will be reabsorbed by the tree or bush.



G. Davenport, Wilderness Survival, Stackpole Books (p. 144)

Figure 1-8-2 Transpiration Bag

CONFIRMATION OF TEACHING POINT 3

QUESTIONS

Q1. What are the two bags called that collect water from condensation?

Q2. For best results, how often should you change the vegetation in the vegetation bag?

Q3. When should you drain both bags?

ANTICIPATED ANSWERS

A1. Vegetation bag and transpiration bag.

A2. Change the vegetation every two to three days.

A3. Be sure to drain off all liquid prior to sunset each day, or it will be reabsorbed by the tree or bush.

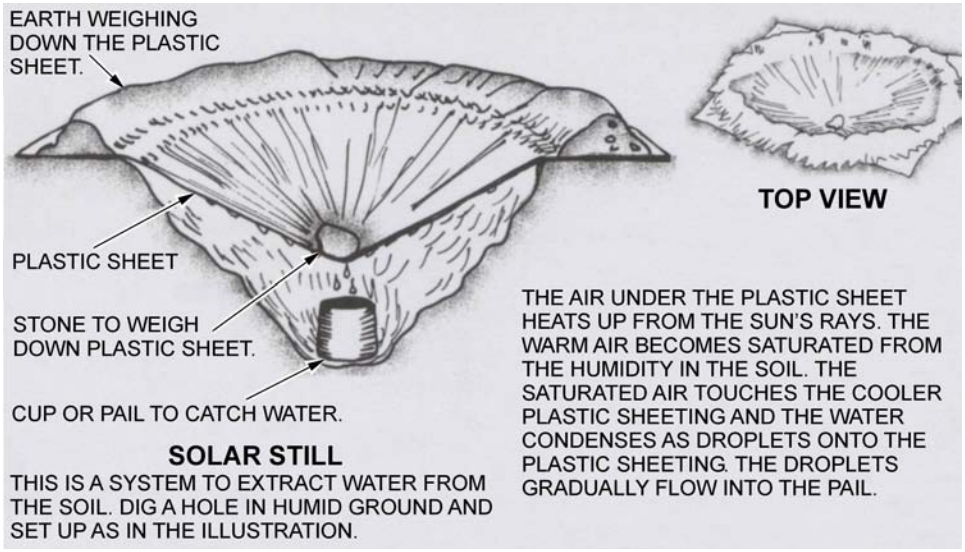
Teaching Point 4 **Demonstrate the Construction of a Solar Still**

Time: 15 min Method: Demonstration

Have a solar still constructed for the cadets to view while the demonstration is being conducted.

CONSTRUCTION OF A SOLAR STILL

1. Dig a hole in the ground approximately 90 cm (36 inches) across and 45 cm (18 inches) deep.
2. Place a collecting can in the centre of the hole.
3. Cover the hole with a sheet of plastic.
4. Secure the edges of the plastic sheet with heavy stones or using the dirt dug from the hole.
5. Place a fist-sized stone in the centre of the plastic sheet, above the collecting can.


EARTH WEIGHING DOWN THE PLASTIC SHEET.
PLASTIC SHEET
STONE TO WEIGH DOWN PLASTIC SHEET.
CUP OR PAIL TO CATCH WATER.
SOLAR STILL
THIS IS A SYSTEM TO EXTRACT WATER FROM THE SOIL. DIG A HOLE IN HUMID GROUND AND SET UP AS IN THE ILLUSTRATION.
TOP VIEW
THE AIR UNDER THE PLASTIC SHEET HEATS UP FROM THE SUN'S RAYS. THE WARM AIR BECOMES SATURATED FROM THE HUMIDITY IN THE SOIL. THE SATURATED AIR TOUCHES THE COOLER PLASTIC SHEETING AND THE WATER CONDENSES AS DROPLETS ONTO THE PLASTIC SHEETING. THE DROPLETS GRADUALLY FLOW INTO THE PAIL.

P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 151)

Figure 1-8-3 A Solar Still

CONFIRMATION OF TEACHING POINT 4

QUESTIONS

Q1. What are the dimensions of the hole that is to be dug?

Q2. After placing the collecting can in the centre of the hole, what is the next step?

Q3. What secures the edges of the plastic sheet?

ANTICIPATED ANSWERS

A1. The dimensions of the hole in the ground are approximately 90 cm (36 inches) across and 45 cm (18 inches) deep.

A2. Cover the hole with a sheet of plastic.

A3. Heavy stones.

Teaching Point 5 — **Explain How Water Condensation Transfers From the Ground to the Underside of the Plastic Sheet and Drips Into the Collecting Can**

Time: 5 min — Method: Interactive Lecture

WATER CONDENSATION

The sun's heat raises the temperature of the air and soil below the surface and vapour is produced. By placing the sheet of plastic over the hole, the vapour is trapped and the air becomes saturated. The water condenses on the underside of the plastic, running down into the container. This is especially effective in desert regions and elsewhere when it is hot during the day and cold at night. The plastic cools more quickly than the air, causing heavy condensation. This kind of still should collect at least 55 cubic cm (cc) (1 pint) over a 24-hour period.

CONFIRMATION OF TEACHING POINT 5

QUESTIONS

Q1. How is vapour produced?

Q2. What happens as the air becomes saturated?

Q3. How much water should this type of still collect?

ANTICIPATED ANSWERS

A1. The sun's heat raises the temperature of the air and soil below the surface.

A2. As the air becomes saturated, water condenses on the underside of the plastic, running down into the container.

A3. This type of still should collect at least 55 cc (1 pint) over a 24-hour period.

Teaching Point 6 — **Have the Cadets, in Groups of No More Than Five, Construct a Solar Still**

Time: 15 min — Method: Performance

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets, in groups of no more than five, construct a solar still.

RESOURCES

- Clear plastic bags,
- Cup or pail, and
- Shovel.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

1. Divide the cadets into groups of no more than five.
2. Have the cadets choose a location for their stills.
3. Have the cadets dig a hole approximately 90 cm (36 inches) across and 45 cm (18 inches) deep.
4. Have the cadets place a collecting can in the centre of the hole.
5. Have the cadets cover the hole with a sheet of plastic.
6. Have the cadets secure the edges of the plastic sheet with heavy stones or the dirt dug from the hole.
7. Have the cadets place a fist-sized stone in the centre of the plastic sheet, above the collecting can.

The questions in the confirmation of TP 4 should be asked of the groups as the instructor moves from one group to the next.

The stills will remain overnight to collect water.

SAFETY

Ensure the cadets stay within the set boundaries of the solar still construction area.

CONFIRMATION OF TEACHING POINT 6

QUESTIONS

Q1. What challenges were encountered while building the solar still?

Q2. Where is the collecting can placed?

Q3. What is the purpose of a solar still?

ANTICIPATED ANSWERS

A1. Answers will vary. Encourage the cadets to elaborate on their challenges.

A2. The collecting can is placed in the centre of the hole.

A3. The purpose of a solar still is to collect water.

Teaching Point 7 **Demonstrate Distilling Water Using an Improvised Distillation Kit**

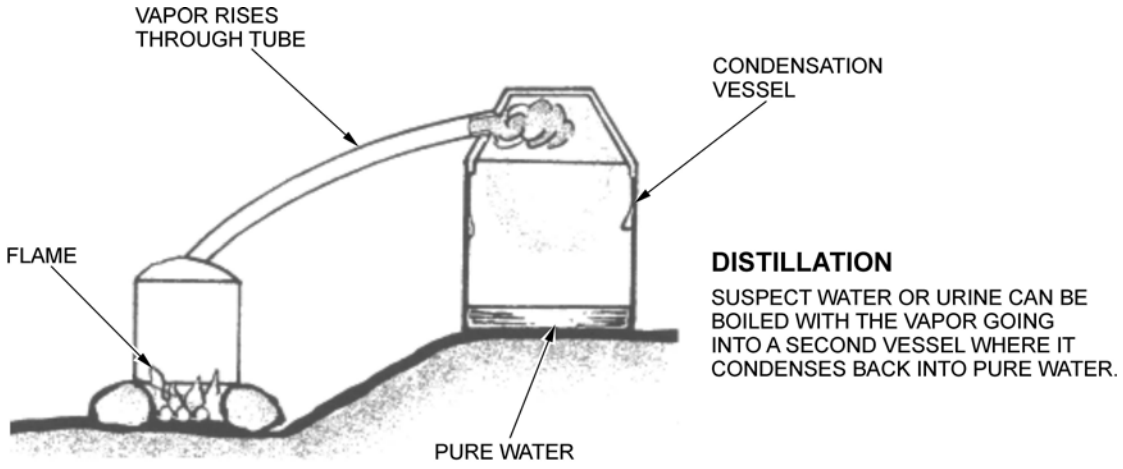
Time: 5 min Method: Demonstration

Have cadets view the distillation kit that was built prior to the lesson.

To distill water one needs to make an improvised distillation kit.

1. Place the contaminated water in a covered container and place over a fire.
2. Connect the covered container to a sealed collecting tin with a piece of tubing. It is preferable to have the collecting tin in another container.

To avoid wasting water vapour, seal around the joints with mud or wet sand.



P. Tawrell, Camping and Wilderness Survival: The Ultimate Out Doors Book, Paul Tawrell (p. 152)

Figure 1-8-4 Improvised Distillation Kit

CONFIRMATION OF TEACHING POINT 7

QUESTIONS

Q1. What do you need to distill liquid?

Q2. Which containers is the tube attached to?

Q3. What can you do to avoid wasting water vapour?

ANTICIPATED ANSWERS

A1. You need to make an improvised distillation kit to distill liquid.

A2. The tube is passed through the top of a water-filled covered container and preferably, is set inside another container.

A3. To avoid wasting water vapour, seal around the joints with mud or wet sand.

Teaching Point 8 **Demonstrate and Have Cadets Use Water Purification Tablets**

Time: 5 min Method: Demonstration and Performance

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets use water purification tablets in the water collected by their solar still.

RESOURCES

Water purification tablets.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

1. Have the cadets collect the water from their solar still.
2. Have the cadets place a tablet into the cup/can and follow directions on the package.
3. Have the cadets drink the purified water.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 8

The cadets' participation in using the purification tablets will serve as the confirmation for this TP.

Teaching Point 9 **Have the Cadets Disassemble the Solar Still and Fill in the Hole**

Time: 5 min Method: Performance

TP 9 will be conducted on Day Two of the exercise.

DISASSEMBLE THE SOLAR STILL

1. Have the cadets check the solar stills for water collection.

2. Have the cadets measure the amount of water in the containers.
3. Have the cadets remove all items from the hole and fill in the hole with the removed dirt.
4. Have the cadets ensure the ground looks as natural as possible.

CONFIRMATION OF TEACHING POINT 9

The cadets' participation in the disassembly of the solar still will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' collection and purification of water will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-826/PF-001, Chapter 3, Annex B, Appendix 1 (PC S291).

CLOSING STATEMENT

It is important for the cadets to understand the importance of water and how to collect and purify it in a survival situation. Water may not be readily available and the cadets will have to use other resources to find it. Remember thirst is one of the seven enemies of survival.

INSTRUCTOR NOTES/REMARKS

The solar still must remain in place overnight as both the heat from the sun and the cool air at night are required for the water condensation process to occur. For scheduling purposes, TPs 1–6 will be done on Day One of the schedule and TPs 7–9 will occur on Day Two.

REFERENCES

C3-002 (ISBN 0-00-653140-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.

C3-003 (ISBN 1-896713-00-9) Tawrell, P. (1996). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Paul Tawrell.

C3-150 (ISBN 978-0-8117-3292-5) Davenport, G. (2006). *Wilderness Survival*. Mechanicsburg, PA: Stackpole Books.

ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 9

EO S291.09 – IDENTIFY ANIMALS AND INSECTS FOR FOOD

Total Time: 40 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content, and become familiar with the material prior to delivering the lesson.

Photocopy handout located at Annex C for each cadet.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TPs 1 and 3 to present new material to the cadets.

Demonstration and performance was chosen for TP 2 as it allows the instructor to explain and demonstrate finding animals and insects and provides an opportunity for the cadets to practice the skill under supervision.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall be expected to identify animals and insects for food.

IMPORTANCE

It is important for cadets to be able to identify animals and insects for food in a survival situation. After a few days the body will need nourishment which is provided by the animals and insects in the surrounding area.

Teaching Point 1 **Identify Edible Insects**

Time: 10 min Method: Interactive Lecture

EDIBLE INSECTS

Insects provide ample amounts of protein, fats, carbohydrates, calcium and iron. Insects can be found throughout the world, and they are easy to procure. Worms contain the highest class of protein with a large proportion of essential amino acids and are easily collected. Although a fair number of insects can be eaten raw, it is best to cook them in order to avoid ingesting unwanted parasites. Collect only living specimens. Avoid any that look sick or dead, have a bad smell or produce skin irritation or a rash when handled.

As a general rule, avoid insects that carry disease (eg, flies, mosquitoes, and ticks), poisonous insects (eg, centipedes and spiders), and insects that have fine hair, bright colours, and eight or more legs.

NUTRITION BREAKDOWN

Insect (per 100 g)	Protein (g)	Fats (g)	Carbohydrates (g)	Calcium (mg)	Iron (mg)
Crickets	**12.9**	**5.5**	**5.1**	**75.8**	**9.5**
Small Grasshoppers	**20.6**	**6.1**	**3.9**	**35.2**	**5.0**
Giant Water Beetles	**19.8**	**8.3**	**2.1**	**43.5**	**13.6**
Red Ants	**13.9**	**3.5**	**2.9**	**47.8**	**5.7**
Silkworm Pupae	**9.6**	**5.6**	**2.3**	**41.7**	**1.8**
Termites	**14.2**	**N/A**	**N/A**	**0.050**	**35.5**
Weevils	**6.7**	**N/A**	**N/A**	**0.186**	**13.1**

G. Davenport, Wilderness Survival., Stackpole Books (p. 161)

Figure 1-9-1 Nutritional Value

Insects which can be eaten are bees and wasps, hornets, beetle grubs, locusts, aquatic insects, snails, slugs and worms.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. What nutritional value do insects provide?

Q2. Which insect from the list has the highest amount of protein per 100 grams?

Q3. What types of insects should be avoided?

ANTICIPATED ANSWERS

A1. Insects provide ample amounts of protein, fats, carbohydrates, calcium and iron.

A2. Small grasshoppers have the highest amount of protein per 100 grams.

A3. Avoid insects that carry disease (eg, flies, mosquitoes, and ticks), poisonous insects (eg, centipedes and spiders), and insects that have fine hair, bright colours, and eight or more legs.

Teaching Point 2 **Demonstrate and Have the Cadet Find Animals and Insects**

Time: 15 min Method: Demonstration and Performance

SIGNS OF FEEDING

Signs of feeding include:

- the way in which bark has been stripped from trees;
- the gnawed shells of nuts;
- partially eaten fruits;
- bitten off shoots;
- the remains of prey; and
- animals of carnivores or the destruction of nests.

Discarded fruits or nuts are often found when food is plentiful—an animal finds one piece not to its liking and drops it to try another. They not only reveal an animal's presence but suggest bait for traps.

A skilled eye can often identify the species of animal by the pattern left by tooth or beak marks on a nut, or the way in which a pine cone has been stripped to get at its seeds.

DROPPINGS

Droppings give one of the best indications of whether an animal is a herbivore or a carnivore. Size of the animal can be judged from their mass and quantity; dryness is an indication of how long since the droppings were passed. Old droppings will be hard and odourless—fresh, wet and still smelling. Flies draw attention to droppings.

Mammals

Many mammal droppings have a strong scent. Animals that live on vegetation, such as cattle, deer and rabbits, produce roundish and strawy droppings. The droppings from a meat eater, like cats, are long and tapered. Break open a dropping to see if there are any clues to what the animals have been eating, then bait accordingly.

ROOTINGS

Some animals root up the ground in search of insects and tubers. If the earth is still crumbly and fresh an animal is likely to have been active on the spot recently. Small scratches may be where a squirrel or other rodents have been digging for shoots.

SCENTS AND SMELLS

Listen to the noises around you, register the smells. They are certain to include indications of the wildlife present, and where one kind of animals exists there will be others.

ACTIVITY

Time: 10 min

OBJECTIVE

The objective of this activity is to have cadets find animals and insects.

RESOURCES

N/A.

ACTIVITY LAYOUT

This activity must be conducted outdoors during daylight hours.

ACTIVITY INSTRUCTIONS

1. Divide the cadets into groups of two.
2. Instruct cadets on how to find animals or insects.
3. Have cadets search for animals or insects and show the instructor.
4. Supervise and give feedback on the cadets' findings.

SAFETY

Ensure cadets do not scare animals or unnecessarily kill insects.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. What is one of the best indications of whether an animal is a herbivore or carnivore?

Q2. Name three techniques for finding animals and insects.

Q3. What type of animals produce roundish and strawy droppings?

ANTICIPATED ANSWERS

A1. Droppings are one of the best indications of whether an animal is a herbivore or carnivore type.

A2. Signs of feeding, droppings, rootings, scents and smells, and burrows and dens.

A3. Animals that live on vegetation, such as cattle, deer and rabbits, produce roundish and strawy droppings.

Teaching Point 3 **Identify Animals and Insects by Tracks and Habitats**

Time: 10 min Method: Interactive Lecture

TRACKS

Animal tracks consist of bent blades of grass, gnawed bone, broken seeds, the dragged body or tail, and the footprint of the animal.

All prints of an animal are not the same as they depend upon:

- the age of the animal;
- the movement of the animal—walking, running, bounding;
- the material it is walking on—sand, mud, clay, grass, or snow;
- the season—some animals have extra fur on their paws in the winter; and
- the age of the tracks.

When you see a track:

- choose a well defined area of the track;
- study the track to determine the direction of travel, the forefoot and hind foot pattern;
- determine if there are any body rub points such as a dragged tail, dragged foot, or dragged fur of the animal;
- determine if the animal is running, hopping, walking, trotting, or just meandering.

HABITATS

Burrows and Dens

Many animals make their homes in burrows, usually on high ground away from water. Some, such as rabbits and ground squirrels, use little effort to conceal them, although one or two exits will be hidden for use in an emergency. Rabbits' emergency holes are easily dug out; a piece of bramble or barbed wire can be pushed down the hole to hook the rabbit out.

Insect gatherings

Many insects are inactive during the heat of the day, although most will emerge to collect moisture when it rains. Look for them in nooks and crannies of trees and behind the bark, in the tissue and seed pods of plants, in any moist shady spots and on the beds of pools of water and streams. The larvae and grubs of many insects are edible and easily found in rotten logs, underground, or under the bark of dead trees. Ants' and termites' nests are often immediately recognizable mounds. Snails can be found in fresh water, salt water and from deserts to alpine meadows. Slugs are simply snails without shells.

Take care when foraging for insects. Their hiding places may also harbour unwelcome creatures such as scorpions and spiders or in larger crannies, snakes.

CONFIRMATION OF TEACHING POINT 3

QUESTIONS

Q1. What do the prints of an animal depend on?

Q2. What is usually on high ground, away from water?

Q3. What is edible and easily found in rotten logs, underground, or under the bark of dead trees.

ANTICIPATED ANSWERS

A1. The prints of an animal depend on the age of the animal, the movement of the animal—walking, running, bounding, the material it is walking on—sand, mud, clay, grass or snow, the season—some animals have extra fur on their paws in the winter, and the age of the tracks.

A2. Burrows are usually on high ground, away from water.

A3. The larvae and grubs of many insects are edible and easily found in rotten logs, underground, or under the bark of dead trees.

END OF LESSON CONFIRMATION

The cadets' participation in the activity of TP 2 will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

Being able to identify animals and insects becomes a very important role in a survival situation. After a few days the body will need nourishment which is provided by the animals and insects in the surrounding area.

INSTRUCTOR NOTES/REMARKS

Cadets may eat insects they catch after it is inspected by an instructor.

REFERENCES

C3-002 (ISBN 0-00-653140-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.

C3-003 (ISBN 1-896713-00-9) Tawrell, P. (1996). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Paul Tawrell.

C3-150 (ISBN 978-0-8117-3292-5) Davenport, G. (2006). *Wilderness Survival*. Mechanicsburg, PA: Stackpole Books.

ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 10

EO S291.10A – CONSTRUCT FISHING EQUIPMENT

Total Time:	40 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TP 1 to introduce a new subject.

Demonstration was chosen for TP 2 as it allows the instructor to explain and demonstrate the skill the cadet is expected to acquire.

Performance was chosen for TP 3 as it is an interactive way to have the cadet practice constructing fishing equipment.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have constructed fishing equipment.

IMPORTANCE

It is important for the cadet to learn to construct fishing equipment because in a survival situation the ability to catch food is essential. Consumption of protein will satisfy hunger and enable the cadet to ward off fatigue.

Teaching Point 1 **Discuss Types of Fishing Tackle**

Time: 5 min Method: Interactive Lecture

The world is covered with water, and fish should not be overlooked as a food source.

FISHING TACKLE

Hook

Some commonly used hooks are skewers and shank hooks (made from bone, wood, or plastic) and safety pin hooks. Large hooks will catch large fish like salmon and pike. Small ones will catch a range of sizes, but it will also be able to catch small fish like perch, bass and trout.

Line

Although a line can be attached to a single pole it is more efficient to set multiple lines tied to the end of one or several long, straight branches. By sticking these poles into the ground one can catch fish while attending to other chores. Lines can be made by twisting bark or cloth fibres.

Float

Along the line attach a small floating object, easily visible from the shore. When the object disappears one will be able to see when the line has a bite. The float's position will help control where the line descends.

Weight

Small weights between the float and the hook will stop the line from following a current while trailing, still leaving the hook in movement. A deeper hook position can be ensured by extending the line to a weight below the float.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. What are four types of fishing tackle?

Q2. What is the most efficient method when setting out a line?

Q3. What is the purpose of the weight?

ANTICIPATED ANSWERS

A1. Hook, line, float and weight.

A2. To set out multiple lines tied to the end of one or several long, straight branches.

A3. Small weights between the float and the hook will stop the line from following a current while trailing, still leaving the hook in movement.

Teaching Point 2 **Explain and Demonstrate Constructing Fishing Equipment**

Time: 15 min Method: Demonstration

Ensure the fishing equipment is available to show to the cadets in this TP.

IDENTIFY HOOKS

Standard Hook

A standard hook from any tackle store should be included in the survival kit. There should be two standard hooks: a small hook and a large hook.

Skewer Hook

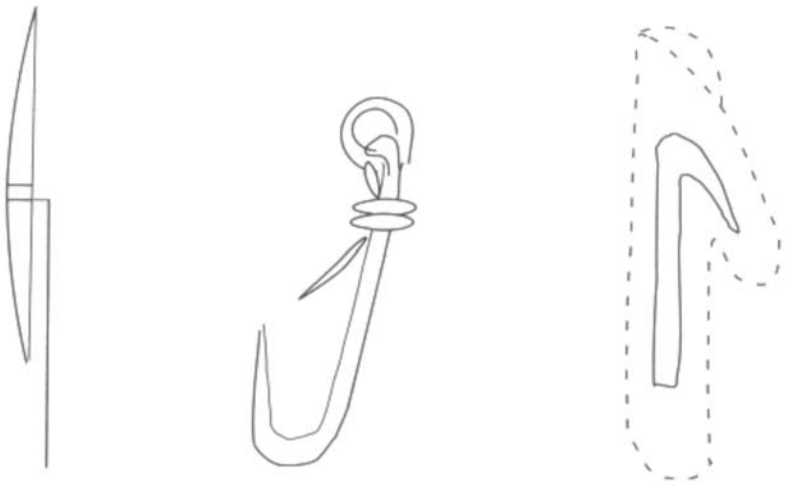
A skewer hook is a sliver of wood or plastic that is notched and tied at the middle. When baited, this hook is turned parallel to the line making it easier for the fish to swallow. Once the fish takes the bait, a simple tug on the line will turn the skewer sideways, lodging it in the fish's mouth.

Shank Hook

A shank hook is made by carving a piece of wood or plastic until it takes the shape of a hook; it is notched and tied at the top. When the fish swallows the hook, a gentle tug on the line will cause the hook end to lodge in the fish's throat.

Safety Pin Hook

A safety pin can be manipulated to create a hook. Depending on the size of the safety pin, this system can catch fish of various sizes.

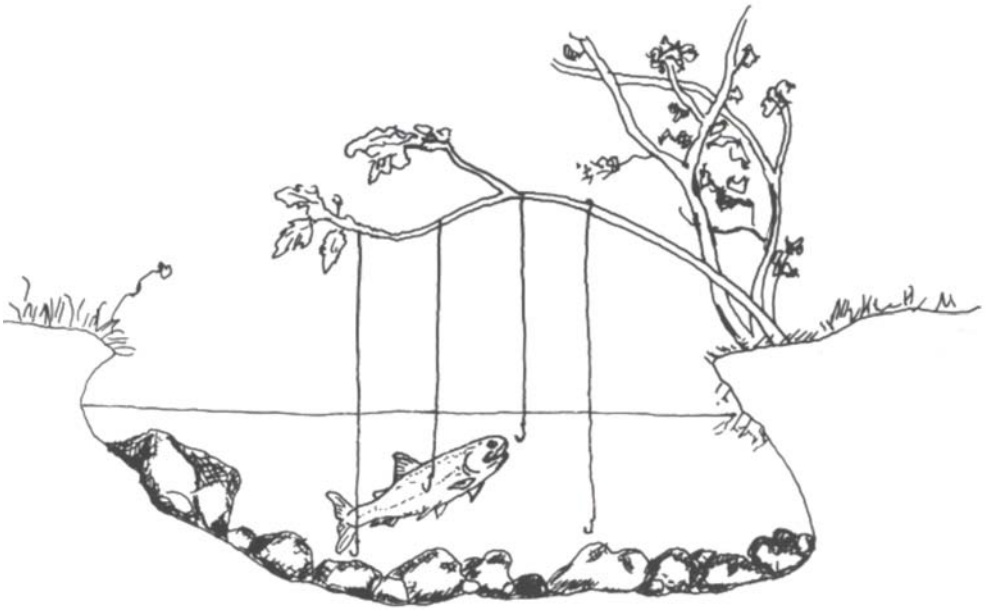


G. Davenport, Wilderness Survival, Stackpole Books (p.167)

Figure 1-10-1 Fishing Hooks

IDENTIFY LINES

A line can be attached to a single pole, but it is more efficient to set multiple lines tied to the end of one or several long, straight branches. By sticking these poles into the ground one can catch fish while attending to other chores.

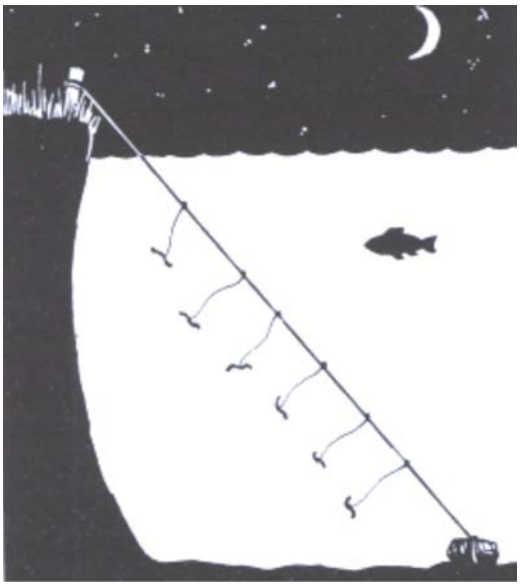


G. Davenport, Wilderness Survival, Stackpole Books (p.167)

Figure 1-10-2 Fishing with Multiple Lines

Night Lines

Weight one end of a length of line and attach hooks at intervals along it; bait them with worms. When lowered in the water it has the chance to catch surface-, mid- and bottom-feeders. Anchor the free end of the line securely on the bank. This line can be put in the water and left until morning. In the morning change the worms, even if nothing has been caught because fresh wiggling worms will attract more attention.



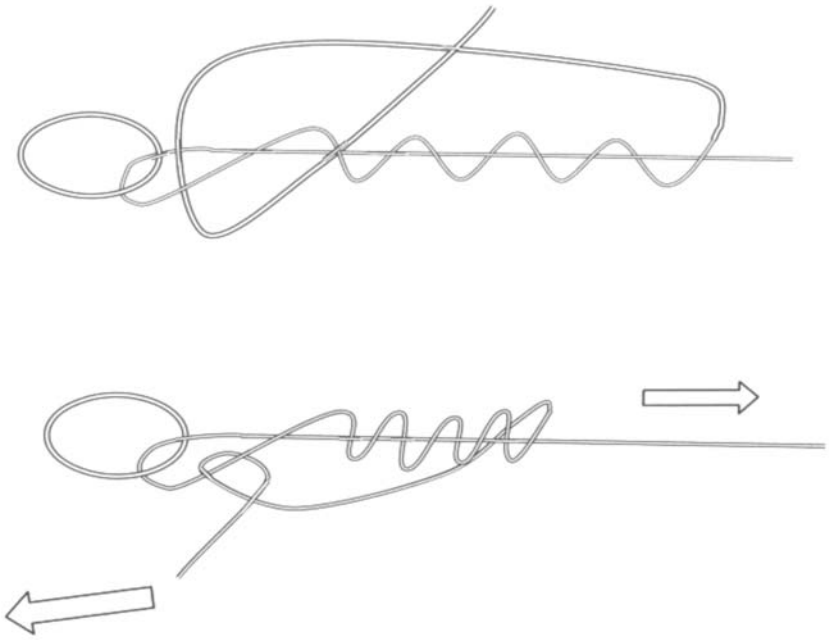
J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 187)

Figure 1-10-3 Night Lines

ATTACH THE HOOK TO THE LINES

To attach a standard hook (which should be in a survival kit), shank hook, or safety pin hook, use an improved clinch knot. All other hooks can be attached to a line using any type of knot. Steps to attach a hook with a clinch knot:

1. Run the free end of the line through the hook eye and fold it back onto itself.
2. Wrap the free end up and around the line six or seven times.
3. Run the line's free end down and through the newly formed loop just above the hook eye.
4. Run the line through the loop formed between the two lines twisted together and the free end.
5. Moisten the knot, and pull it tight. Cut the excess line.



G. Davenport, Wilderness Survival, Stackpole Books (p.167)

Figure 1-10-4 Clinch Knot

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. What are four types of hooks?

Q2. What type of knot should be used to tie a standard hook, a safety pin hook, or a shank hook?

Q3. Why should the worms on the night lines be changed in the morning?

ANTICIPATED ANSWERS

A1. Skewer hook, standard hook, shank hook and safety pin hook.

A2. A clinch knot.

A3. Wriggling worms will attract more attention.

Teaching Point 3 **Have the Cadet Construct Fishing Equipment**

Time: 15 min Method: Performance

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets construct fishing equipment.

RESOURCES

- Fishing line,
- Fishing hooks, and
- Knife.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

1. Have each cadet cut fishing line to construct either a single or multiple line fishing equipment.
2. Have the cadets find branches or poles to build their fishing equipment.
3. Have the cadets attach the lines to the poles.
4. Supervise and give feedback on the construction of the fishing equipment.
5. Have the cadets explain why they chose to make either the single or multiple line fishing equipment.
6. Have the cadets disassemble the fishing equipment and return materials to the instructor.

SAFETY

Ensure the cadets do not misuse the equipment.

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in the activity will serve as the confirmation for this TP.

END OF LESSON CONFIRMATION

The cadets' participation in constructing fishing equipment will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-826/PG-001, Chapter 3, Annex B, Appendix 1 (PC S291).

CLOSING STATEMENT

Constructing fishing equipment can be essential in a survival situation. Fish are an excellent source of protein. Fishing is an effective method to catch food while expending minimal effort while doing so.

INSTRUCTOR NOTES/REMARKS

Ensure the cadets do not play with the fishing hooks when they are not constructing fishing equipment.

REFERENCES

C3-002 (ISBN 0-00-653140-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.

C3-150 (ISBN 978-0-8117-3292-5) Davenport, G. (2006). *Wilderness Survival*. Mechanicsburg, PA: Stackpole Books.

ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 11

EO S291.10B – CONSTRUCT SNARES

Total Time: 40 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Cut 60 cm lengths of non-ferrous wire for each cadet. Have spares on hand in case extras are needed.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TP 1 to introduce a new subject.

Performance was chosen for TPs 2 and 4 as it is an interactive way to introduce the cadet to constructing simple snares and squirrel traps.

Demonstration was chosen for TP 3 as it allows the instructor to explain and demonstrate constructing a squirrel trap to the cadet.

INTRODUCTION

REVIEW

The review for this lesson will be of EO M290.03 (Construct a Simple Snare, A-CR-CCP-802/PF-001, Chapter 16, Section 3).

OBJECTIVES

By the end of this lesson the cadet shall have constructed a simple snare and a squirrel trap.

IMPORTANCE

It is important for the cadets to learn to construct snares because in a survival situation the ability to catch food is essential. Consumption of protein will satisfy hunger and enable the cadets to ward off fatigue.

Teaching Point 1 **Discuss Types of Snares**

Time: 5 min Method: Interactive Lecture

Snares are the simplest of traps and snare wire should be part of any survival kit. Snares are made from non-ferrous wire with a running eye at one end through which the other end of the wire passes before being firmly anchored to a stake, rock or tree. A snare is a free running noose which can catch small game around the throat and larger game around the leg.

TYPES OF SNARES

Simple Snare. A simple snare may be made of brass wire, string, plant cordage, roots, horse hair, rawhide, dried animal guts, etc. The best material for constructing a simple snare is non-ferrous wire because it keeps its round shape and is easily twisted to make a loop through which the moving part of the wire will slide.

Squirrel Trap. A squirrel trap is made with several small nooses on an inclined log. The squirrel will pass its head through the noose and fall off the log. The dangling squirrel will not deter other squirrels from being caught.

Baited Spring Snare. A baited spring snare lifts game off the ground. Game is tempted with food. The noose is laid on the ground and the bait strung above. As game takes the bait the trigger is released. The baited spring snare is suited for medium-sized animals, such as foxes. This trap can be located in an open area as the bait will attract animals. A small clearing in the woods is a good site for the baited spring snare.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. Name three types of snares.

Q2. Which snare is made with several small nooses on an inclined log?

Q3. Which snare has a noose laid on the ground?

ANTICIPATED ANSWERS

A1. A simple snare, a squirrel trap and a baited spring snare.

A2. A squirrel trap is made with several small nooses on an inclined log.

A3. The baited spring snare.

Teaching Point 2 **Review and Have the Cadet Construct a Simple Snare**

Time: 10 min Method: Performance

SIMPLE SNARE

Ensure you have practiced constructing a simple snare before demonstrating this procedure to the cadets.

Instructions for constructing a simple snare:

1. Use non-ferrous wire, make a loop, fist width wide, and twist the end of the loop to ensure its stability while allowing the moving part to slide easily.
2. Set the loop vertically four fingers above the ground using twigs. Ensure the loop is a hand's width away from obstructions on either side of the path.
3. Anchor the remaining wire to a stake, rock or tree.

J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p.187)

Figure 1-11-1 A Simple Snare

ACTIVITY

OBJECTIVE

The objective of this activity is for the cadet to construct a simple snare.

RESOURCES

Non-ferrous wire 60 cm in length. (one per cadet).

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

1. Have each cadet work individually.
2. Distribute non-ferrous wire 60 cm in length to each cadet.
3. Instruct cadets to find an appropriate site to construct a simple snare.
4. Have cadets construct a simple snare.
5. Supervise and give feedback on the construction of simple snares.
6. Have cadets disassemble the simple snares and return materials to the instructor.

SAFETY

Ensure cadets do not misuse the equipment.

Watch where you are walking and be careful not to step on a simple snare.

CONFIRMATION OF TEACHING POINT 2

The cadets' construction of a simple snare will serve as the confirmation of this TP.

Teaching Point 3 **Explain and Demonstrate the Construction of a Squirrel Trap**

Time: 10 min Method: Demonstration

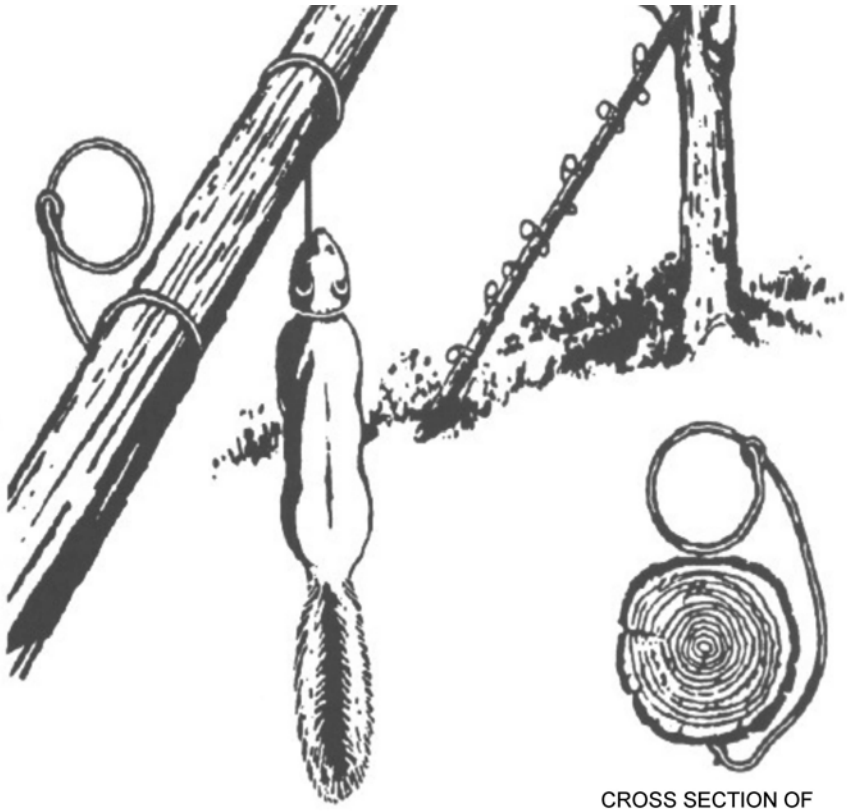
SQUIRREL TRAP

A squirrel trap is an efficient means to catch multiple squirrels with minimal time, effort or materials. When searching for an area to build the squirrel trap, look for an area with signs of feeding (eg, look for mounds of pine cone scales), usually on a stump or fallen tree. After placing a pole against a stump or fallen tree and an initial period of caution, they will try to go up or down the pole and will get caught in the snare. The struggling animal will soon fall from the pole and strangle itself. Other squirrels will soon follow and, in this way, several squirrels can be caught. Multiple poles can be set up to increase the catch.

Ensure you have practiced constructing a squirrel trap before demonstrating this procedure to the cadets.

Instructions for constructing a squirrel trap: (see Figure 1-11-2)

1. Attach several simple snares along the top and sides of a pole, approximately 1.83 m long (six feet long).
2. Position the snares about 2.5 cm off the pole.
3. Place the top and bottom simple snares 45 cm from the top and bottom of the pole to prevent the squirrel from getting its feet on a solid surface.
4. Lean the pole onto an area that has indications of multiple squirrel feeding signs.



"Food", Wilderness-Survival. Retrieved October 31, 2007, from http://www.wilderness-survival.net/food-2.php

Figure 1-11-2 A Squirrel Trap

CONFIRMATION OF TEACHING POINT 3

QUESTIONS

Q1. What should you look for when building a squirrel trap?

Q2. What should be attached along the top and sides of the pole?

Q3. Where should the pole be placed?

ANTICIPATED ANSWERS

A1. When searching for an area to build the squirrel trap, look for an area with signs of feeding (eg, look for mounds of pine cone scales), usually on a stump or fallen tree.

A2. Several simple snares should be attached to the pole.

A3. Lean the pole onto an area that has indications of multiple squirrel signs of feeding.

Teaching Point 4 **Have the Cadet Construct a Squirrel Trap**

Time: 10 min Method: Performance

ACTIVITY

OBJECTIVE

The objective of this activity is for the cadets to construct a squirrel trap.

RESOURCES

Non-ferrous wire 60 cm in length (five per cadet).

ACTIVITY LAYOUT

This activity must be conducted outside during daylight hours.

ACTIVITY INSTRUCTIONS

1. Have the cadets work individually.
2. Distribute five lengths of non-ferrous wire 60 cm in length to each cadet.
3. Instruct the cadets to find an appropriate site to construct a squirrel trap.
4. Have the cadets construct a squirrel trap.
5. Supervise and give feedback on the construction of squirrel traps.
6. After each cadet has finished constructing a squirrel trap, bring all cadets back to one central location.
7. Have the entire group look at each squirrel trap, if time permits.
8. Have the cadets disassemble the squirrel traps and return materials to the instructor.

SAFETY

Ensure the cadets do not misuse the equipment.

CONFIRMATION OF TEACHING POINT 4

The cadets' construction of a squirrel trap will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in TPs 2 and 4 will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-826/PG-001, Chapter 3, Annex B, Appendix 1 (PC S291).

CLOSING STATEMENT

Constructing snares is essential in a survival situation. The ability to feed yourself will ward off fatigue and eliminate one of the seven enemies of survival.

INSTRUCTOR NOTES/REMARKS

All snares will be disassembled immediately after completion of TPs 2 and 4.

REFERENCES

C3-002 (ISBN 0-00-653140-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.

C3-003 (ISBN 1-896713-00-9) Tawrell, P. (1996). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Paul Tawrell.

C3-118 Wilderness Survival. (2007). *Food*. Retrieved March 12, 2007, from http://www.wilderness-survival.net/chpt19.php.

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ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 12

EO S291.11 – IDENTIFY METHODS OF PREPARING AND COOKING A SMALL ANIMAL OR FISH

Total Time: 80 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and practice skinning a small animal or preparing a fish and cooking a small animal or fish with the equipment provided, prior to delivering the lesson.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

Demonstration was chosen for this lesson as it allows the instructor to explain and demonstrate skinning a small animal, preparing a fish and cooking a small animal or fish.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall be expected to identify methods of preparing and cooking a small animal or fish.

IMPORTANCE

It is important for the cadets to understand the methods of preparing and cooking a small animal or fish in a survival situation because before you can eat what you have caught you have to understand how to prepare the animal or fish and cook it. Proper preparation and cooking minimizes the chances of getting sick and helps to preserve the food.

Teaching Point 1 **Explain and Demonstrate Skinning a Small Animal**

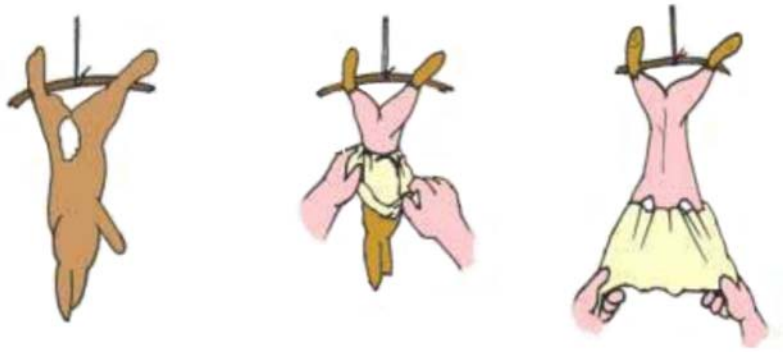
Time: 20 min Method: Demonstration

Practice skinning a small animal before demonstrating this procedure to the cadets.

SKINNING A SMALL ANIMAL

For best results, the steps for skinning a small animal should be done in the sequence outlined below.

1. Remove urine by holding the animal's forelegs and gradually squeeze down on the body from the chest to the bowels.
2. Cut a hole in the belly area.
3. Pull the skin apart at the hole and insert the first fingers of each hand. Pull the skin apart exposing the innards. Remove the innards.
4. Cut the skin around the front and hind paws and between the hind legs.
5. Hang the small animal and pull off the skin.
6. Remove the skin by pulling it over the head.
7. Dismember the small animal by cutting off the head.



"Dressing", Simple Survival, Retrieved March 15, 2007, from http://www.simplesurvival.net/dressing.htm

Figure 1-12-1 Skinning a Small Animal

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. How do you remove urine from the animal's body?

Q2. What area of the animal's body is first cut?

Q3. What is the last step in skinning an animal?

ANTICIPATED ANSWERS

A1. Remove the urine by holding the animal's forelegs and gradually squeeze down on the body from the chest to the bowels.

A2. The first cut is made in the belly area.

A3. Dismemberment.

Teaching Point 2 **Explain and Demonstrate Preparing a Fish**

Time: 20 min Method: Demonstration

PREPARING A FISH

To prevent spoilage, prepare the fish as soon as possible. The innards can be used as bait or else bury it in the ground as the odour will attract insects and scavengers. Keep the fish cool and cook as soon as possible.

Practice preparing a fish before demonstrating this procedure to the cadets.

1. **Bleeding**

   As soon as a fish is caught, cut its throat and allow it to bleed. Wipe the slime off the fish to make it less slippery. Do not let any slime get in your eyes. Cut out the gills.

2. **Gutting**

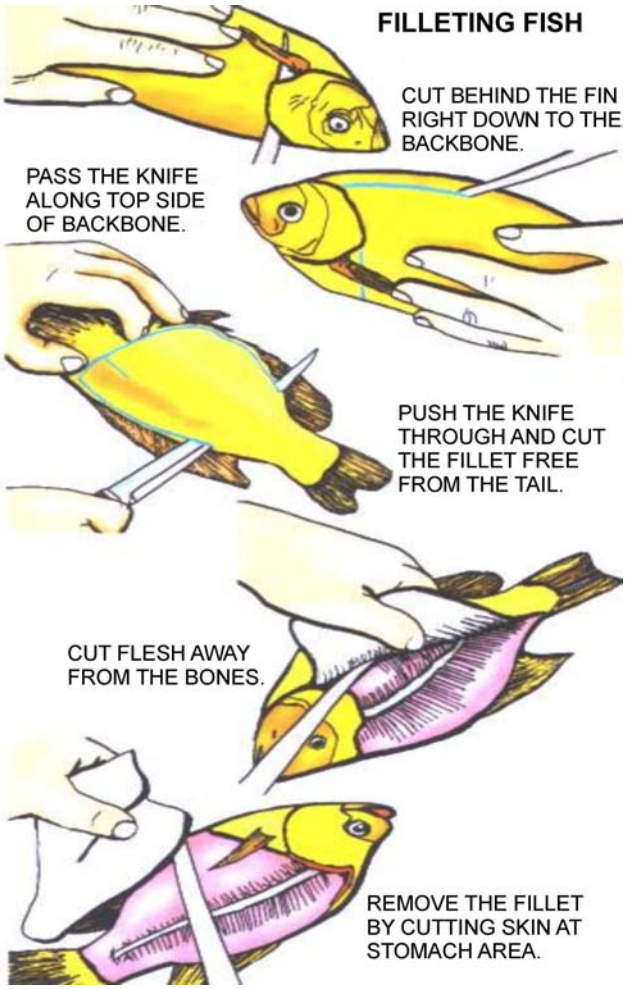
   Make an incision from the anal orifice to where the throat was cut. Remove the entrails—you can use them for hook bait. Keep the roe, which runs down the side of the fish. It is hard in females, soft in males; it is very nutritious.

3. **Scaling**

   Scaling is not necessary and fish can be cooked with scales on, but if there is time, scrape them off. Remove scales by holding the tail and pushing a dull knife across the skin at a forty-five degree angle. Draw the knife from tail to head.

4. **Filleting**

   Filleting is one way of preparing a fish. Pass the knife along the top side of the backbone. Cut behind the fin down to the backbone. Push the knife through and cut the fillet free from the tail. Cut the flesh away from the bones. Remove the fillet by cutting the skin at the stomach area.


FILLETING FISH
CUT BEHIND THE FIN RIGHT DOWN TO THE BACKBONE.
PASS THE KNIFE ALONG TOP SIDE OF BACKBONE.
PUSH THE KNIFE THROUGH AND CUT THE FILLET FREE FROM THE TAIL.
CUT FLESH AWAY FROM THE BONES.
REMOVE THE FILLET BY CUTTING SKIN AT STOMACH AREA.

P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 144)

Figure 1-12-2 Filleting a Fish

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. What is done as soon as a fish is caught?

Q2. What should you do with the entrails?

Q3. What is the process for filleting?

ANTICIPATED ANSWERS

A1. As soon as a fish is caught, cut its throat and allow it to bleed.

A2. Remove the entrails—you can use them for hook bait.

A3. Filleting:

1. Pass the knife along the top side of the backbone.
2. Cut behind the fin down to the backbone.

3. Push the knife through and cut the fillet free from the tail.
4. Cut the flesh away from the bones.
5. Remove the fillet by cutting the skin at the stomach area.

Teaching Point 3 **Explain and Demonstrate Cooking a Small Animal or Fish**

Time: 30 min Method: Demonstration

COOKING A SMALL ANIMAL OR FISH

In addition to killing parasites and bacteria, cooking food can make it more palatable. The methods chosen for cooking a small animal or fish simulate the items one may have in a survival situation.

Practice cooking a small animal or fish before demonstrating each procedure to the cadets. Prepare all materials before the start of the class.

GRILLING

The following are some considerations for grilling food:

- Grilling is a quick way of cooking large amounts of food but it requires a support—such as wire mesh—rested on rocks over the embers of the fire.
- It should only be used when food is plentiful since it wastes most of the fat from the meat.
- Hot rocks beside the fire can be used as grilling surfaces.

Grilling:

1. Place the large rocks on either side of the fire for the green sticks to rest on.
2. Place the green sticks in grid formation on the rocks above the fire.
3. Place food on the green sticks and cook until the meat is no longer pink.

IF NO WIRE MESH IS AVAILABLE, MAKE A GRID OF VERY GREEN STICKS OR REST A LONG STICK ON A FORKED SUPPORT SO THAT IT CAN HOLD FOOD OVER THE FIRE. WRAP FOOD AROUND THE STICK. YOU CAN ALSO BARBECUE MEAT AND VEGETABLES ON A STICK SUPPORTED ACROSS GLOWING EMBERS BY A FORKED STICK ON EACH SIDE.

J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 284)

Figure 1-12-3 Grilling

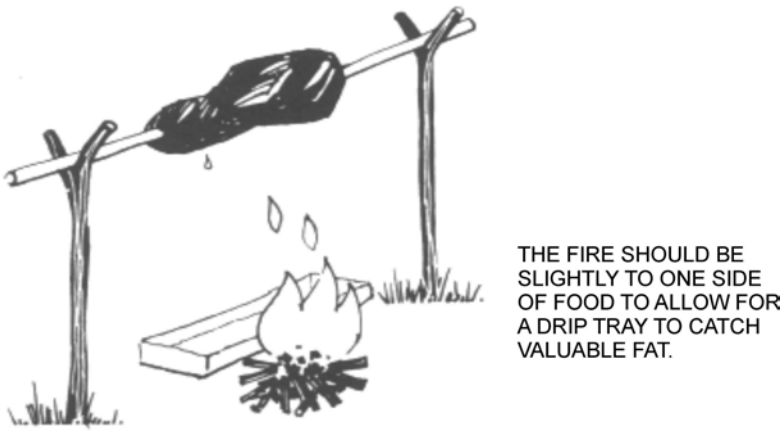
ROASTING

The following are some considerations for roasting food:

- Roasted meat cooks in its own fat.
- Continually turning the meat keeps the fat moving over the surface.
- The easiest method is to skewer the meat on a spit and turn it over the hot embers of a fire or beside a blazing fire where it is hot enough to cook.
- Roasting makes a very tasty dish but has two disadvantages:
    - Valuable fat is lost unless a drip tray is placed beneath the spit. Regularly baste the meat with fat from the tray.
    - Roasting by a fierce fire can cook and seal the outside, the inner flesh remaining uncooked, leaving harmful bacteria alive. A slow roast is preferable, and the inner flesh can continue cooking after the outer meat has been cut off.

Roasting:

1. Build a spit with two Y shaped sticks and a green stick as the centrepiece.
2. Place the spit over the fire.
3. Skewer the meat and place it on the spit. Turn it over the hot embers of the fire or the spit can be placed beside a blazing fire where it is hot enough to cook. If possible place a drip pan under the meat to catch the fat.
4. Continue turning the meat so that the fat moves over the surface.



J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 284)

Figure 1-12-4 Roasting

FRYING

The following are some considerations for frying:

- Frying is an excellent way of varying your diet if fat is available and you have a container to fry food in.
- Any sheet of metal that you can fashion into a curve or give a slight lip will serve as a pan.
- In some areas, you may find a large leaf which contains enough oil that will not dry out before the cooking is done.
- Before you risk valuable food on them try the leaves first. See if the leaves burn when placed over the embers. If you use a large leaf, fry only over embers, not over flames.

Frying:

1. Place a flat rock or sheet of metal on or next to the fire. (Avoid rocks with high moisture content, they may explode).
2. Let the rock or metal heat up and cook on it as you would a frying pan.

CONFIRMATION OF TEACHING POINT 3

QUESTIONS

Q1. What are three types of cooking methods?

Q2. Which type of cooking should only be used when food is plentiful?

Q3. What material can serve as a pan?

ANTICIPATED ANSWERS

A1. Grilling, roasting and frying.

A2. Grilling should only be used when food is plentiful since it wastes most of the fat from the meat.

A3. Any sheet of metal that you can fashion into a curve or give a slight lip will serve as a pan.

END OF LESSON CONFIRMATION

The cadets' participation in identifying methods of preparing and cooking a small animal or fish will serve as the confirmation for this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

It is important for the cadets to understand the methods of preparing and cooking a small animal or fish in a survival situation because before you can eat what you have caught you have to understand how to prepare and cook it. Proper preparation and cooking minimizes the chances of getting sick and helps to preserve the food.

INSTRUCTOR NOTES/REMARKS

Cadets who feel uncomfortable with skinning a small animal do not have to participate in that portion of the class but should be present for the TP on preparing a fish.

REFERENCES

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ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 13

EO S291.12 – COLLECT EDIBLE PLANTS

Total Time: 80 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Find out if any cadets have allergies to the fruits and vegetables being used.

Photocopy the handout located at Annexes D and E for each cadet.

Prepare all fruit and vegetables needed for the activity in TP 1.

Research the common edible plants for the area.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

Demonstration and performance was chosen for TP 1 as it allows the instructor to demonstrate testing and collecting common plants while providing an opportunity for the cadet to practice testing and collecting common plants under supervision.

An interactive lecture was chosen for TPs 2 and 3 to present collecting edible plants to the cadet.

A practical activity was chosen for TP 4 as it is an interactive way to introduce the cadets to collecting plants.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have collected edible plants.

IMPORTANCE

It is important for the cadets to know how to test for poison, identify common edible plants, identify both poisonous and non-poisonous plants and be able to collect plants in a survival situation. Plants are an excellent source of nutrition when animals are not abundant. Many plants have health benefits which are also important in a survival situation.

Teaching Point 1 **Demonstrate and Have the Cadet Perform the Universal Edibility Test**

Time: 25 min Method: Demonstration and Performance

UNIVERSAL EDIBILITY TEST

Always adopt the following procedure when trying out potential new food plants. NEVER take short cuts and complete the whole test. If in any doubt, do NOT eat the plant.

Inspect

Separate the plant into its basic sections (leaves, stems, roots and flowers). Inspect each section one at a time. Try to identify. Ensure that the plant is not slimy or worm-eaten. Some plants, when old, change their chemical content and become toxic.

Smell

Crush a small portion. Smell the plant for strong or acid odours. Also, if it smells of bitter almonds or peaches —DISCARD.

Rub the plant on the skin

Rub slightly or squeeze some of the juice on to a tender part of the body (under the arm between the armpit and the elbow, for instance). If any discomfort, rash or swelling is experienced—DISCARD and reject for future use. Wait 15 minutes and if there is no reaction, continue.

Place the plant on the lips, mouth and tongue

If there is no irritation to the skin proceed with the following steps, going on to the next step only after waiting three minutes to check that there is no unpleasant reaction:

1. Place a small portion on the lips.
2. Place a small portion in the corner of the mouth.
3. Place a small portion on the tip of the tongue.
4. Place a small portion under the tongue.
5. Chew a small portion.

In all cases: if any discomfort is felt, such as soreness to the throat, irritation, stinging or burning sensations —DISCARD.

Swallow

Swallow a small amount and wait eight hours. During this period eat or drink nothing else.

EAT

If there is no reaction such as soreness to the mouth, repeated belching, nausea, sickness, stomach pains, griping pains in the lower abdomen or any other distressing symptoms are experienced, the plant may be considered safe. Eat a larger portion and wait eight hours again.

ACTIVITY

Time: 15 min

OBJECTIVE

The objective of this activity is to have the cadets test plants for poison.

RESOURCES

- Lemons,
- Celery stalks,
- Onions,
- Berries (in season), and
- Spinach leaves.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

The cadets do not have to wait the eight hours before being able to eat again for this TP.

Ensure the cadets follow the format for testing for poison. Have the cadets:

1. take a piece of fruit or vegetable;
2. inspect the fruit or vegetable;
3. smell the fruit or vegetable;
4. rub the fruit or vegetable on their arm or underside of the wrist;
5. place a small portion of the fruit or vegetable on their lips;
6. place a small portion of the fruit or vegetable in the corner of their mouths;
7. place a small portion of the fruit or vegetable on the tip of their tongue;
8. place a small portion of the fruit or vegetable under their tongue;
9. chew a small portion of the fruit or vegetable;
10. choose another piece of fruit or vegetable and repeat the activity; and

11. repeat the activity until all have had a chance to try at least three different textures and tastes.

SAFETY

Ensure the cadets do not share the fruits and vegetables being used in the activity.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in the activity will serve as the confirmation of this TP.

Teaching Point 2 **Identify Common Edible Plants**

Time: 10 min Method: Interactive Lecture

COMMON EDIBLE PLANTS

The Berry Rule

In general, the edibility of berries can be classified according to their colour and composition. Use it as a general guide to determine whether the edibility test needs to be performed upon the berry. The only berries that should be eaten without testing are those that can be positively identified as non-poisonous.

Follow the berry rule:

- Green, yellow and white berries are 10 percent edible.
- Red berries are 50 percent edible.
- Purple, blue and black berries are 90 percent edible.
- Aggregate berries such as thimbleberries, raspberries and blackberries are considered 99 percent edible.

Edible Parts of a Plant

Some plants are completely edible, whereas others have both edible and poisonous parts. Plants can be broken down into several distinct components: underground, stems and leaves, flowers, fruits, nuts, seeds and grains, gums, resins, and saps.

Underground (tubers, roots and rootstalks, and bulbs)

Found underground, these plant parts have a high degree of starch and are best served baked or boiled. Some examples of these are potatoes (tuber), cattail (root and rootstalk), and wild onion (bulbs).

"Cattails", Aquasprings, 2007, Retrieved November 15, 2007, from http://www.aquaspringsinfo.com/cattails.jpg

Figure 1-13-1 Cattail

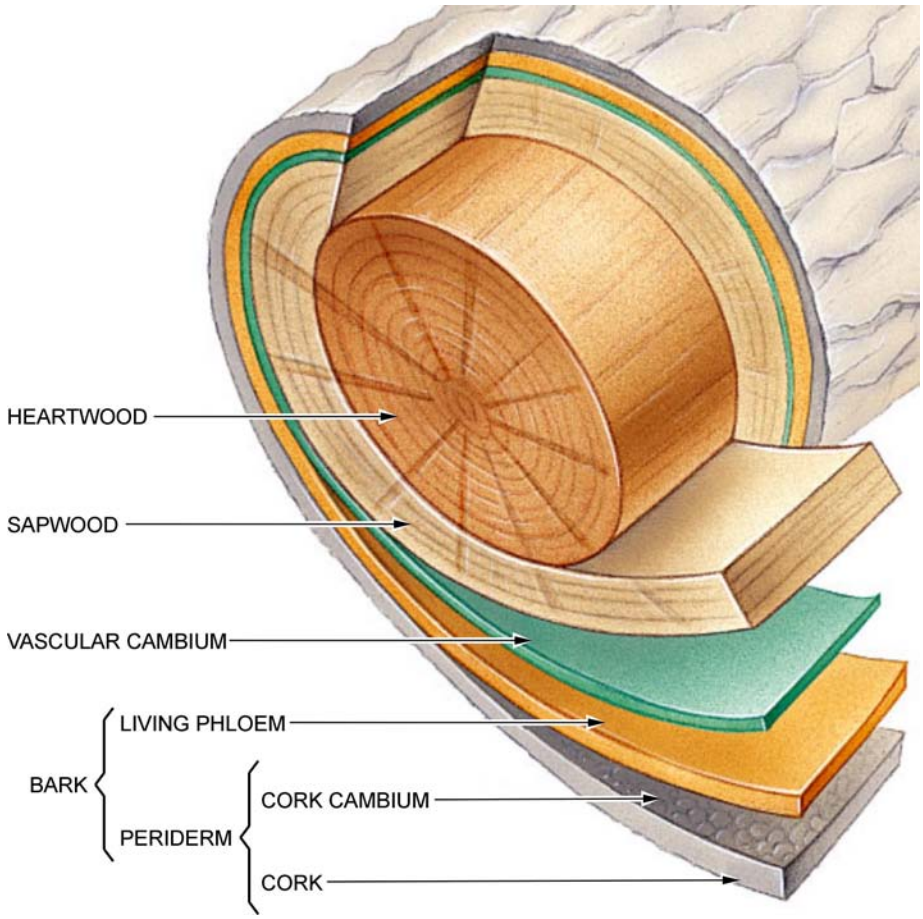
Stems and Leaves (shoots/stems, leaves, pith, and cambium)

Plants that produce stems and leaves are probably the most abundant source of edible vegetation in the world. Their high vitamin content makes them a valuable component of our daily diet. Shoots grow like asparagus and are best when parboiled. Some examples of these are bracken fern, young bamboo and cattail.

Leaves may be eaten raw or cooked but to achieve the highest nutritional value, they are best eaten raw.

Pith, found inside the stem of some plants, is often very high in its food value. Some examples are sago, rattan, coconut and sugar.

Cambium is the inner bark found between the bark and the wood of a tree. It can be eaten raw, cooked, or dried and then pulverized into flour.



"Plant Structure and Function", UIC. Retrieved November 15, 2007, from http://uic.edu/classes/bios/bios100/lectf03am/treetrunk.jpg

Figure 1-13-2 Cambium

Flowers (flowers, buds and pollens)

Flowers, buds and pollens are high in food value and are served best when eaten raw or in a salad. Some examples include hibiscus (flower), rosehips (buds), and cattail (pollen).

"Holistic Healing", About.com. Copyright 2007 by About, Inc. Retrieved November 15, 2007, from http://healing.about.com/od/floweressences/ig/Flower-Essence-Gallery/Hibiscus.htm

Figure 1-13-3 Hibiscus

Fruits (Sweet and Nonsweet)

Fruits are the seed-bearing part of the plant and can be found in all areas of the world. They are best when eaten raw but may also be cooked. Examples of sweet fruits are apples, prickly pears, saskatoon berries and wild strawberries. Examples of nonsweet fruits include tomatoes, cucumber, plantains and horseradish.

Nuts

Nuts are high in fat and protein and can be found around the world. Most can be eaten raw but some, like acorns, require leaching (make (a liquid) seep through some material) with several changes of water to remove their tannic acid.

Seeds and Grains

The seeds and grains of many fruits are a valuable food resource and should not be overlooked. Some examples are grasses and millet and are best eaten when ground into flour or roasted. Purple or black grass seeds should not be eaten; they often contain a fungal contamination.

Gums and Resins

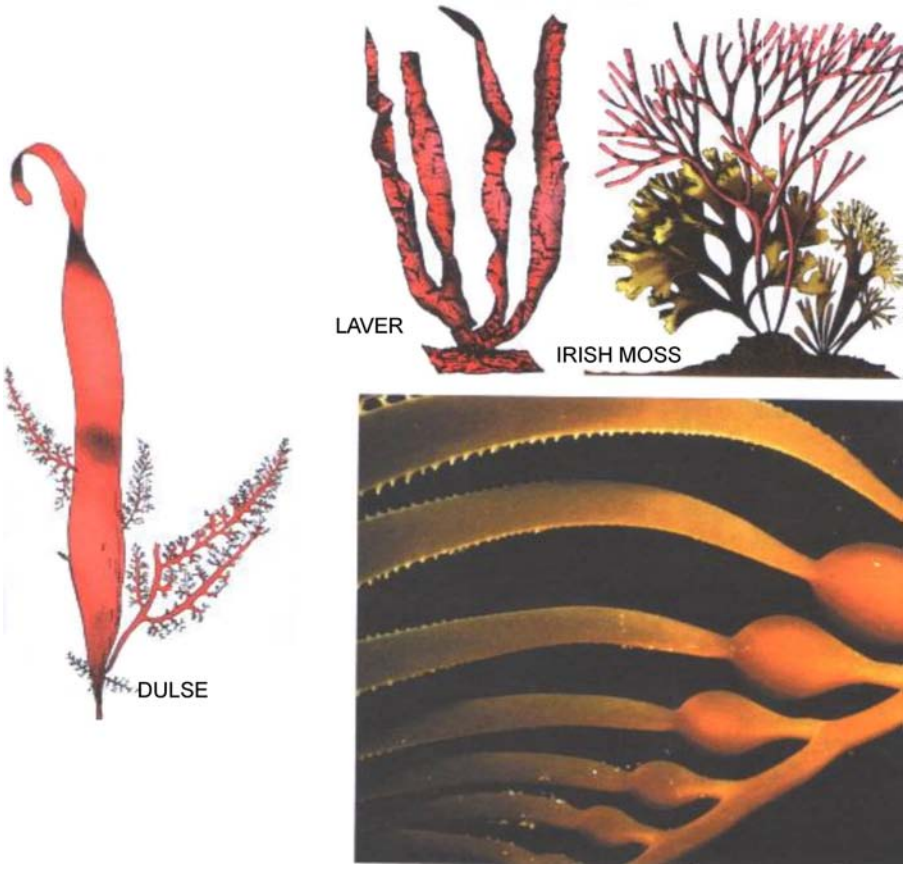
Gums and resins are sap that collect on the outside of trees and plants. Their high nutritional value makes them a great augment to any meal. Examples can be found on pine and maple trees.

Seaweed and Algae

One plant that should never be overlooked is seaweed. It is a form of marine algae found on or near shores. There are also some edible freshwater varieties. Seaweed is a valuable source of iodine, other minerals, and vitamin C.

When gathering seaweed for food, find living plants attached to rocks or that are floating free. Seaweed washed ashore for any length of time may be spoiled or decayed. Freshly harvested seaweed can be dried for later use.

Its preparation for eating depends on the type of seaweed. Thin and tender varieties can be dried in the sun or over a fire until crisp. Crush and add to soups or broths. Boil thick, leathery seaweeds for a short time to soften them. Eat them as a vegetable or with other foods. Some varieties can be eaten raw after testing for edibility. Some examples are dulse, green seaweed, irish moss, kelp, laver, mojaban, and sugar wrack.



"Plants", Wilderness Survival, Copyright 2007 Jalic Inc. Retrieved November 15, 2007, from http://www.wilderness-survival.net/plants-1.php

Figure 1-13-4 Seaweed

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. Which berries are 99 percent edible?

Q2. Which grass seeds should not be eaten?

Q3. What should you look for when gathering seaweed?

ANTICIPATED ANSWERS

A1. Aggregate berries such as thimbleberries, raspberries and blackberries are considered 99 percent edible.

A2. Purple or black seeds.

A3. When gathering seaweed for food, find living plants attached to rocks or that are floating free.

Teaching Point 3 **Identify Common Poisonous Plants**

Time: 10 min Method: Interactive Lecture

Distribute handouts located at Annexes D and E to the cadets.

COMMON POISONOUS PLANTS

Plants generally poison by:

Ingestion. When a person eats a part of a poisonous plant.

Contact. When a person makes contact with a poisonous plant that causes any type of skin irritation or dermatitis.

Absorption or Inhalation. When a person either absorbs poison through the skin or inhales it into the respiratory system.

There are two common poisons in the plant world:

Hydrocyanic Acid. It has the taste and smell of bitter almonds or peaches. The most notable example is the cherry laurel.

Oxalic Acid. Its salts occur naturally in some plants, for instance, wild rhubarb and wood sorrel. It is recognized by the sharp, dry, stinging or burning sensation when applied to the skin or tongue.

PLANTS TO AVOID

Avoid plants with the following characteristics:

- plants with a milky sap, unless positively identified as safe (such as dandelion);
- red plants. The red-streaked stalk of wild rhubarb is edible but its leaf is poisonous. Hemlock has reddish-purple splotches on its stem;
- fruits which are divided into five segments;
- bulbs (resembling onion or garlic);
- carrotlike leaves, roots or tubers;
- bean and pealike appearance;
- fungal infection;

- shiny leaves or fine hairs;
- grasses and other plants with tiny barbs on their stems and leaves;
- old or wilted leaves. The leaves of some trees and plants develop deadly hydrocyanic acid when they wilt —including blackberry, raspberry, cherry, peach and plum. All may be safely eaten when young, fresh and dry; and
- all mushrooms. Mushroom identification is very difficult and must be precise, even more so than with other plants. Two types of mushroom poisoning are gastrointestinal and central nervous system.

Plants Which Cause Dermatitis

The following plants cause dermatitis:

- poison ivy,
- poison oak, and
- poison sumac.

Plants Which Cause Ingestion Poisoning

The following plants cause ingestion poisoning:

- castor bean,
- death camas,
- oleander,
- poison and water hemlock,
- skunk cabbage, and
- stinging nettle.

CONFIRMATION OF TEACHING POINT 3

QUESTIONS

Q1. What are the names of two fairly common poisons in the plant world?

Q2. What colour plant should be avoided?

Q3. Name three plants which cause dermatitis.

ANTICIPATED ANSWERS

A1. Hydrocyanic acid and oxalic acid.

A2. Red plants.

A3. Poison ivy, poison oak and poison sumac.

Teaching Point 4 **Conduct an Activity Where the Cadet Will Collect Edible Plants**

Time: 25 min Method: Practical Activity

ACTIVITY

If poison ivy or other poisonous plants are known to be in the search area, ensure the area is kept off limits to the cadets.

OBJECTIVE

The objective of this activity is to have the cadets collect edible plants.

RESOURCES

N/A.

ACTIVITY LAYOUT

This activity must be conducted outdoors during daylight hours.

ACTIVITY INSTRUCTIONS

1. Divide the cadets into groups of two.
2. Instruct the cadets on how to find edible plants.
3. Have the cadets search for edible plants and show the instructor.
4. Supervise and give feedback on the cadets' findings.

SAFETY

Ensure the cadets do not eat any of their findings until they have been inspected by the instructor.

CONFIRMATION OF TEACHING POINT 4

The cadets' participation in the activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in the collecting of edible plants will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-826/PF-001, Chapter 3, Annex B, Appendix 1 (PC S291).

CLOSING STATEMENT

It is important for the cadets to know how to test for poison, identify both poisonous and non-poisonous plants and be able to collect plants in a survival situation. Plants are an excellent source of nutrition when animals are not abundant or for use in soups and other dishes. Many plants have health benefits which are also important in a survival situation.

INSTRUCTOR NOTES/REMARKS

N/A.

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ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 14

EO S291.13 – CONSTRUCT CAMP CRAFTS

Total Time:	120 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Prepare three camp crafts to use for demonstration purposes.

Photocopy the diagrams detailing camp craft construction for the selected camp crafts located at Annexes F to T for each group of two cadets.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

A practical activity was chosen for this lesson as it is an interactive way to allow the cadets to practice constructing camp crafts in a safe, controlled environment.

INTRODUCTION

REVIEW

EO S292.06 (Tie Knots and Lashings, Chapter 2, Section 6) will serve as the review for this lesson.

OBJECTIVES

By the end of this lesson the cadet shall have constructed two camp crafts.

IMPORTANCE

It is important for the cadets to be able to construct camp crafts in a survival situation so they will be able to combat both the elements and psychological factors (eg, boredom and loneliness). It is important to construct camp crafts that serve a purpose in a survival situation. The amount of energy put into constructing a camp craft should be relative to its usefulness.

Teaching Point 1 **Have the Cadets, in Groups of Two, Construct Two Camp Crafts**

Time: 110 min Method: Practical Activity

For this skill lesson, it is recommended that the instruction take the following format:

1. Explain how the camp crafts that were prepared prior to the lesson were constructed.
2. Divide the cadets into groups of two and distribute the handouts.
3. Have groups choose two camp crafts to construct
4. Supervise the cadets as they construct camp crafts.

Cadets will choose the camp crafts they want to construct. If time allows, have each group construct a third camp craft.

CAMP CRAFTS

Three camp crafts will be chosen from the following:

- a ladder bed,
- a pack frame,
- a shower,
- a washstand,
- a drying rack,
- a tool rack,
- a camp craft for cooking, including:
  - a pot rod,
  - a swinging pot holder, or
  - a Chippewa kitchen;
- a wheel barrow,
- a coat hanger,
- a simple bench,
- a bench with back rest,
- a camp table, or
- a friction-lock table.

ACTIVITY

Time: 110 min

OBJECTIVE

The objective of this activity is to have cadets, in groups of two, construct two camp crafts.

RESOURCES

- Emergency survival kit,
- Knife,
- Cord,
- Axe,
- Bow saw, and
- Diagram detailing camp craft construction (located at Annexes F to T).

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

1. Divide the cadets into groups of two and handout diagrams detailing camp craft construction.
2. Have the cadets construct two camp crafts.
3. When camp crafts are completed, allow time for groups to view all constructed crafts.
4. Do not leave camp crafts behind. Redistribute all natural material used into the bush at the end of the lesson or exercise.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in the activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in constructing camp crafts will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-826/PG-001, Chapter 3, Annex B, Appendix 1 (PC S291).

CLOSING STATEMENT

It is important for the cadets to be able to construct camp crafts in a survival situation so they will be able to combat both the elements and psychological factors (eg, boredom and loneliness). It is important to construct camp crafts that serve a purpose for each survival situation (eg, a fishing pole when there is no water present). The amount of energy put into constructing a camp craft should be relative to its usefulness.

INSTRUCTOR NOTES/REMARKS

Natural resources found in the field, such as fallen or dead wood, are to be used for construction.

The directives found in CATO 11-08 (*Environmental Protection and Stewardship*) are to be followed during this lesson.

The directives included in the TrEES program are to be followed during this lesson.

The more difficult camp crafts should be constructed in advance for demonstration purposes.

REFERENCES

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ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 15

EO S291.14 – PREDICT WEATHER USING CLOUD FORMATIONS

Total Time: 80 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Photocopy handouts located at Annexes V, W and X for each cadet.

Access the Weather Network's website (www.theweathernetwork.com) and go to the weather maps link and pull up the map for systems. Download and print maps from three time periods for each cadet.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for this lesson to introduce predicting weather using cloud formations.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall be expected to predict weather using cloud formations.

IMPORTANCE

It is important for the cadets to learn to predict weather using cloud formations so they can factor for weather in a survival situation. The weather plays an important role when selecting the best action to take while waiting for assistance from rescuers and when deciding the type of shelter to seek or construct.

Teaching Point 1 **Identify Clouds**

Time: 20 min Method: Interactive Lecture

HOW CLOUDS ARE FORMED

Saturation Point. The point that the maximum amount of water has been absorbed by the atmosphere at a given temperature.

Dew Point. The point at which a given area of air must be cooled for water vapour to condense into water.

The atmosphere is made up of several different gases; one of those is water vapour. The air can hold a certain amount of water as invisible water vapour at a given temperature. If the air is cooled it can hold less water and becomes supersaturated. At this point, the water will condense and form clouds.

The following are some definitions of common weather terminology for the instructor to help better understand the material.

Beaufort Scale. A scale of wind strength based on visual assessment of the effects of wind on seas and vegetation.

Coriolis Effect. A deflective force arising from the rotation of the earth on its axis; affects principally global-scale winds. Winds are deflected to the right in the northern hemisphere, and to the left in the southern hemisphere.

Heat Index (HI). An index that combines air temperature and relative humidity to determine an apparent temperature of how hot it actually feels.

Isobar. The lines on a weather map that connect points of equal air pressure.

Relative Humidity. The ratio of the amount of water vapour actually in the air compared to the amount of water vapour the air can hold at the particular temperature and pressure.

Squall Line. Any non-frontal line or band of active thunderstorms.

The following are the three most common ways that clouds are formed:

- The air is cooled below its saturation point. This occurs when air comes into contact with a cold surface, a surface that is cooled by radiation, or the air is cooled when it rises. This cooling can occur:
    - where two air masses of different temperature meet (warm and cold fronts);
    - where the air flows up the side of a mountain and cools as it rises;
    - by the heat of the sun warming of the ground (convection); or
    - when warm air blows over a colder surface such as a cool body of water;
- When two air masses below the saturation point mix (eg, our breath on a cold day, aircraft contrails and arctic sea smoke); or
- If the air stays the same temperature but absorbs more water vapour into it until it reaches the saturation point (evaporation).

TYPES OF CLOUD FORMATIONS

The terms cumulus and stratus are used in most cloud names. In most cases, the height of a cloud will be the prefix (beginning element of a word) and the type will be the suffix (the end element of a word). Discuss the types of cloud formations.

Cloud names come from Latin. Some common words are:

- cirro = high,
- alto = middle,
- nimbus = rain,
- cirrus = curl,
- stratus (as a prefix) = low,
- stratus (as a suffix) = layer, and
- cumulus = pile.

Clouds are classified into two categories based on how they are formed—cumulus and stratus.

Cumulus. The typical clumpy, “puffy” cloud is formed in rising air currents. Cumulus clouds are evidence of unstable air conditions. Cumulus clouds are formed when small areas of rising air cool to the saturation point.

Stratus. These appear “spread out” and in sheets or horizontal layers. Stratus clouds are formed when a layer of moist air is cooled below its saturation point.

THE FOUR FAMILIES OF CLOUDS

Clouds can also be classified according to height. When identifying cloud height, the height of the base of the cloud is used. There are four cloud families:

- high clouds,
- middle clouds,
- low clouds, and
- clouds of vertical development.

This section includes descriptions of some of the clouds found in each family and weather predictions for each. Pictures of these clouds are located at Annex U.

Distribute the handouts located at Annexes V and W for each cadet.

The water in a typical cloud can have a mass of up to several million tonnes.

HIGH CLOUDS

These clouds are very high in the sky and are composed of ice crystals. High clouds have the prefix cirro. There are three types—cirrus, cirrocumulus and cirrostratus.

Cirrus. High, thin, wispy clouds blown by high winds into long streamers. Cirrus clouds usually move across the sky from west to east. They generally indicate pleasant weather.

Cirrocumulus. These clouds are little, white and puffy. They form a huge sheet, covering the sky. The small ripples in the cirrocumulus sometimes resemble the scales of a fish. A sky with cirrocumulus clouds is sometimes referred to as a “mackerel sky.” When cirrocumulus clouds are in the sky, one can predict fair weather.

Cirrostratus. These clouds are white sheets that completely cover the sky. Cirrostratus clouds are normally see-through. When these clouds are in the sky, one can expect precipitation in a day or two.

The long, narrow white clouds left behind jet airplanes are called contrails. They are formed by the moisture coming out of the engine and condensing in the very cold air.

MIDDLE CLOUDS

These clouds are in the middle of the sky and are composed of ice crystals or water droplets. Middle clouds have the prefix alto. There are two main types—altocumulus and altostratus.

Altocumulus. These clouds are very big and can be white or grey. They appear as a layer or a series of patches of rounded masses. The appearance of these clouds on a warm, humid summer morning often means thunderstorms will occur by late afternoon.

Altostratus. These clouds appear as a grey or white sheet that completely covers the sky. The sun can vaguely be seen through it. Altostratus clouds indicate increasing moisture and usually precede precipitation by 24 hours or less.

LOW CLOUDS

These clouds are low in the sky and are composed of water droplets. Low clouds are associated with the word stratus. There are three types—stratus, stratocumulus, and nimbostratus.

Stratus. These clouds appear as low, dull, grey sheets that completely cover the sky (resembling fog). During the day, the sun cannot be seen. They can produce drizzle or very light rain or snow. When deep clouds are above then rain or snow can be heavier.

Stratocumulus. These appear as sheets of big puffy white or grey clouds. Stratocumulus clouds often appear in dark patches or rolls and are often thin with blue sky showing through the breaks. Snow or showers of rain are possible and can be heavy.

Nimbostratus. These appear as dark grey layers of large, puffy clouds. When they produce precipitation, it is in the form of continuous rain or snow. The bottom of this cloud is often hidden by falling rain or snow, which may be heavy.

CLOUDS OF VERTICAL DEVELOPMENT

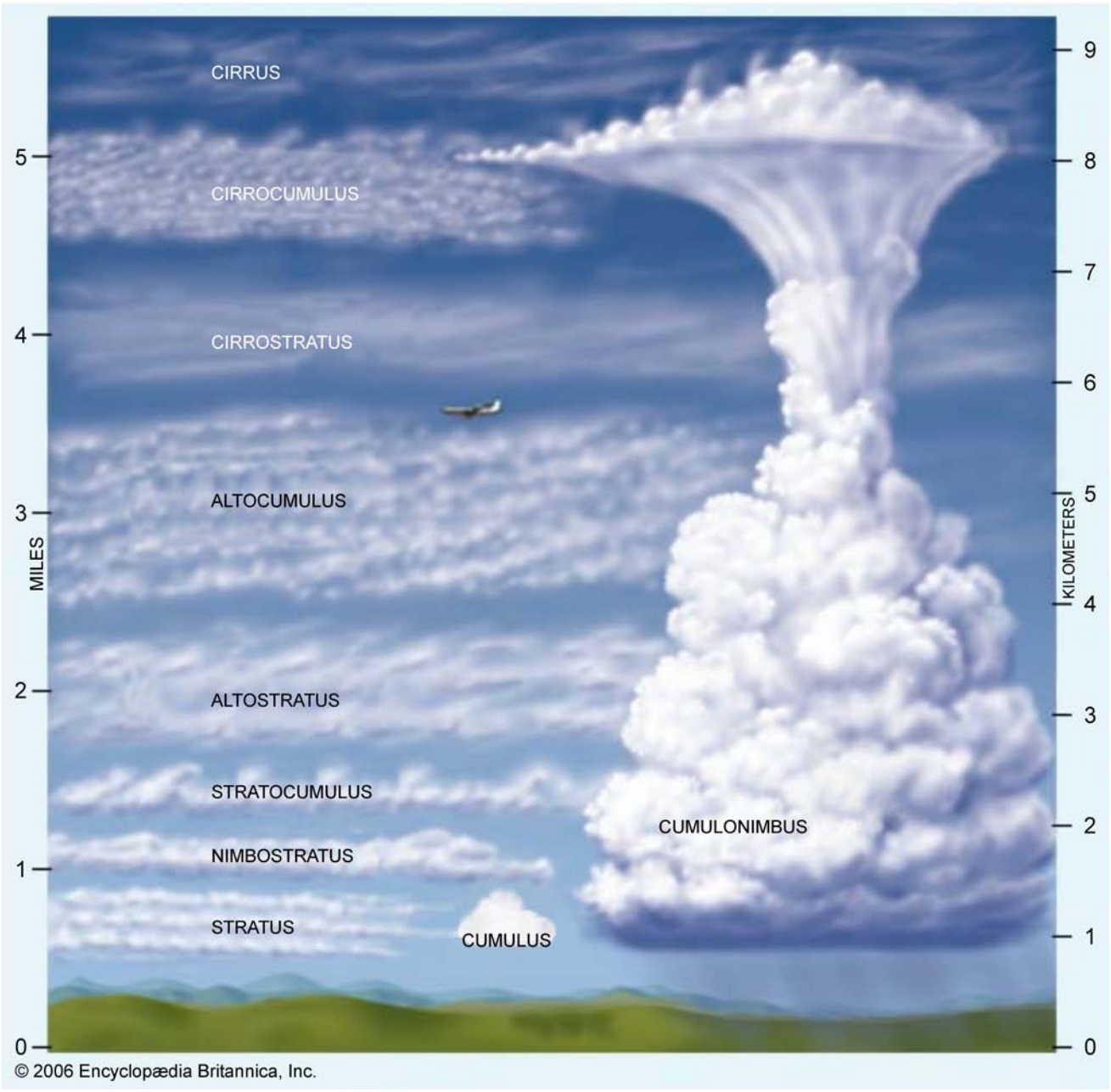
These clouds may be very low in the sky. When the temperature is above freezing (higher than zero degrees), they are composed of water droplets. When the temperature is below freezing (lower than zero degrees), they

are composed of ice crystals and water droplets. Clouds of vertical development are associated with the word cumulus. There are three types—cumulus, towering cumulus, and cumulonimbus.

Cumulus. These clouds are large, individual puffy clouds. They resemble cauliflower or cotton balls; the bottoms often appear dark and flat. They can often be seen on a warm day. When these clouds are in the sky one can expect fair weather, unless they begin to extend upwards.

Towering Cumulus. These clouds build up into high towering masses. They have puffy, white tops but very dark bottoms. Towering cumulus clouds can produce showers and may develop into heavy ice or thunderstorms.

Cumulonimbus. These clouds are very dark at the bottom. They extend way up into the atmosphere and have flattened tops. When cumulonimbus clouds are in the sky, one can predict thunderstorms and windy, rainy conditions.



Cumulus Cloud, by Encyclopaedia Britannica, Inc., 2006, Encyclopaedia Britannica Online, Copyright 2006 by Encyclopaedia Britannica, Inc. Retrieved November 21, 2007, from http://cache.eb.com/eb/image?id=93302&rendTypeId=34

Figure 1-15-1 Cloud Formations

The cloud heights listed in the above figure deviate slightly than the set heights of the cloud layer in the temperate regions. Clouds will occur higher in tropic regions and lower in polar regions.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. What are the three clouds found in the high cloud family?

Q2. What does an altocumulus cloud look like?

Q3. What do nimbostratus clouds look like?

ANTICIPATED ANSWERS

A1. Cirrus, cirrostratus and cirrocumulus.

A2. These clouds are very big and can be white or grey. They appear as a layer or a series of patches of rounded masses.

A3. These appear as dark grey layers of large, puffy clouds.

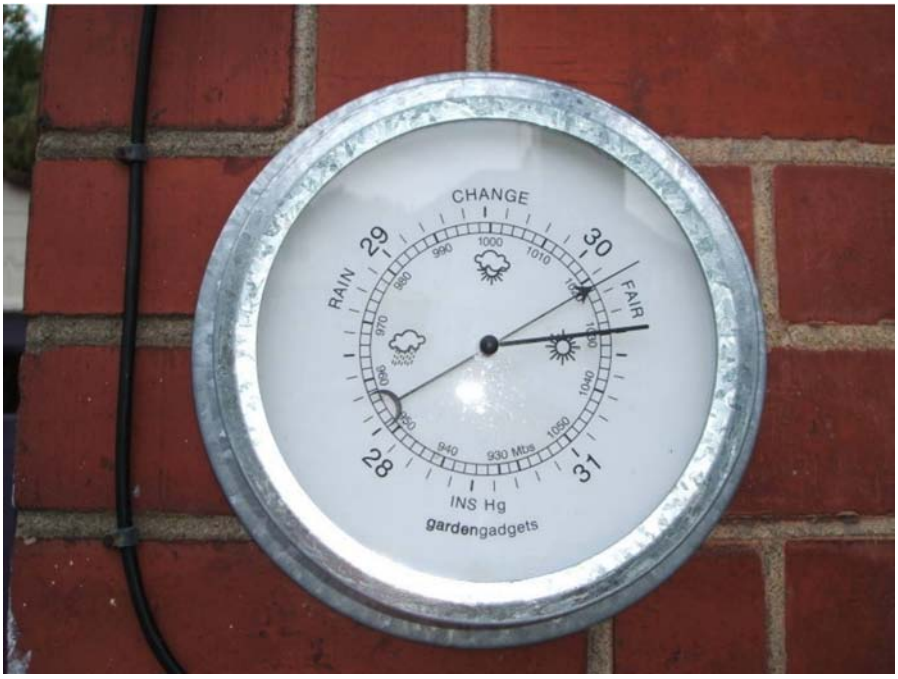
Teaching Point 2 **Discuss How to Predict Approaching Weather**

Time: 30 min Method: Interactive Lecture

PREDICTING WEATHER

Air Pressure. The force of the air pushing down on the Earth's surface. Air pressure is higher near sea level because there is more air at lower altitudes than on the top of a mountain. Changing weather is a result of changing air pressure. Understanding the effects of changing air pressure is important in predicting weather.

Barometer. A well known instrument used to measure atmospheric pressure. It measures the pressure exerted by the atmosphere by using water, air or mercury.



Barometer, by Wikipedia.org, Copyright 2007 by Wikipedia.org. Retrieved November 19, 2007, from http://en.wikipedia.org/wiki/Image:Barometer.JPG

Figure 1-15-2 Barometer

Low Pressure Area. A low or an '"L" (shown on weather maps) is a region of air where the pressure is lowest in relation to the surrounding area. Lows are associated with stronger winds and rising air. This rising air expands and cools and cannot hold as much water, resulting in condensation and cloud formation.

Think about the air rising above a campfire. The air molecules as they are heated begin to expand and leave the Earths' surface, putting less pressure on it. On a large scale, this hot air creates an area of low pressure.

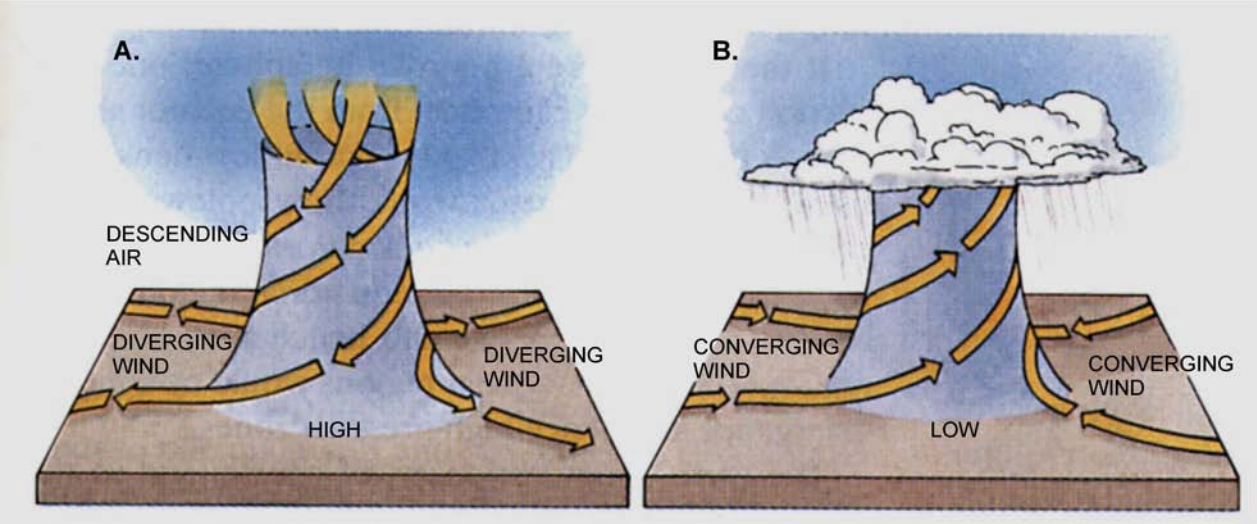
High Pressure Area. A high or an '"H" (shown on weather maps) is a region where the air pressure is highest with relation to the surrounding area.

An area of high pressure is a section of air that is sinking. As the air sinks, it warms allowing it to hold more water. Highs are often associated with fair weather. A high pressure area does not generally mean warmer weather and can bring cold, fog or frost.

Ask the cadets if they were to open a window on a cold winter night and stand in the middle of the room what part of their bodies would be first to feel the cold?

Answer: Feet.

This is because cold air is dense and the molecules are sinking. On a large scale, cold air masses push down on the Earths' surface creating an area of high pressure.



"Atmospheric Circulation", by The University of Florida, Earth Sciences Sector, Copyright 2000 by Dr. David Hodell and Ray G. Thomas. Retrieved November 19, 2007, from http://ess.geology.ufl.edu/ess/Notes/AtmosphericCirculation/convdiv.jpeg

Figure 1-15-3 Air Pressure

Wind

Wind will flow from a high air pressure area to a low air pressure area. Due to the rotation of the Earth and friction, wind will flow around the outside of the high or low pressure areas. Wind strengths are directly related to the difference between high and low air pressure areas; the larger the difference the stronger the winds.

A low pressure system will always be followed by a high pressure system and so on.

Direction of Storms

Wind will flow around a high pressure area in a clockwise direction and around a low pressure area in a counter-clockwise direction. If there is a strong wind, it usually represents a low pressure system. Wind blowing in one's face indicates the pressure is low on the right and this is also the direction of the storm.

Air Temperature

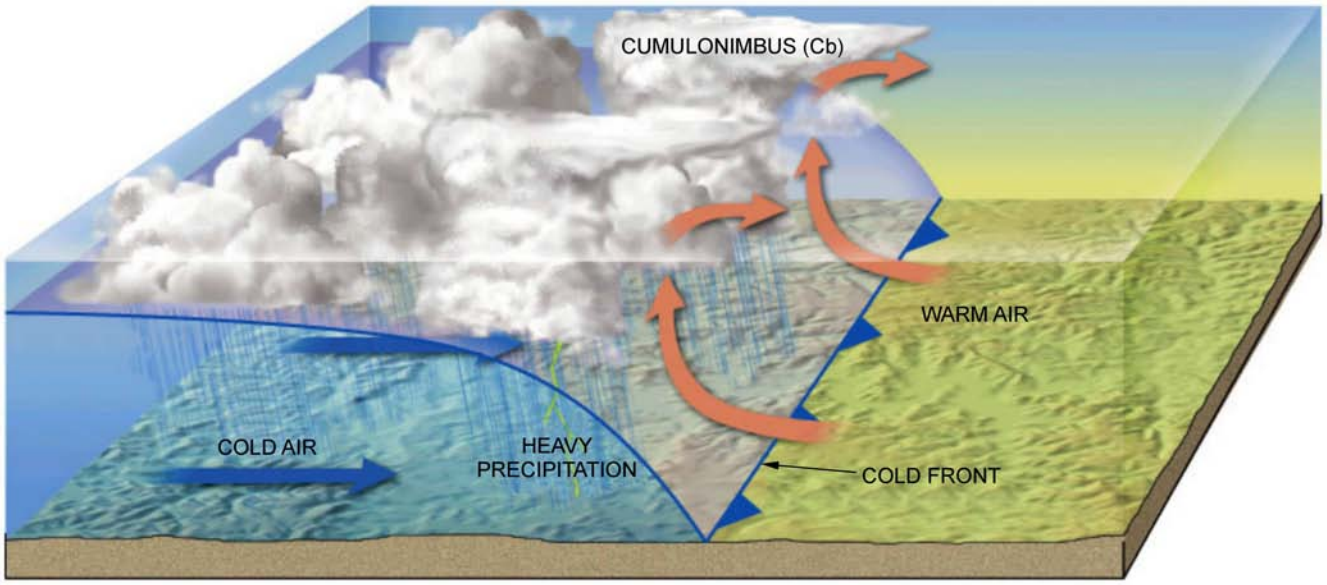
The air temperature has a strong effect on the changes in weather. The temperature of the air is fairly stable within a large area. Changes in weather and clouds are created when two air masses of different temperatures meet.

Weather Front. A boundary that separates two air masses that have different densities. As two air masses collide they will mix along their boundary, but will retain their distinct characteristics.

Cold Front. Cold (more dense) air mass moving into a warmer (less dense) air mass and is characterized by the following:

- abrupt uplift along the frontal boundary;
- cumulus (flat based or anvil-shaped) development;
- short duration heavy rain and thunderstorms; and

- shown as a line of blue, triangles on surface weather maps.

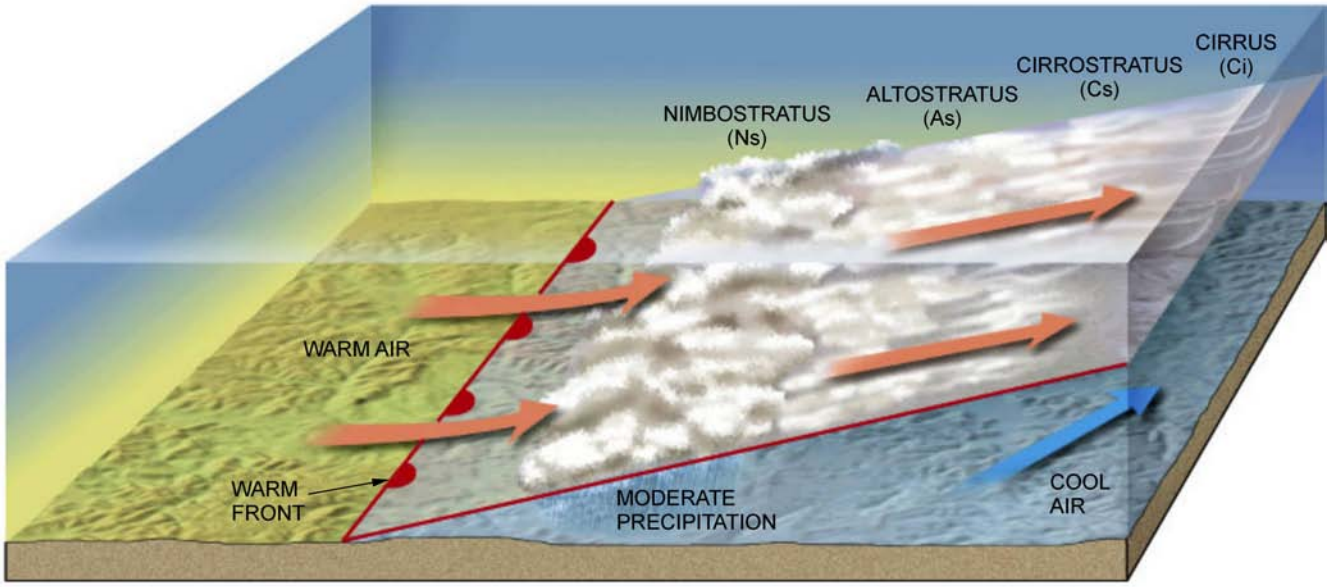


"Fronts, by The Atmosphere", Lutgens and Tarbuck, 8th Edition. Copyright 2001 by John Stimac. Retrieved November 19, 2007, from http://www.ux1.eiu.edu/~jpstimac/1400/fronts.html

Figure 1-15-4 Cold Front

Warm Front. A warm (less dense) air mass moving into a cold air mass and is characterized by the following:

- gentle uplift;
- stratiform (stratus) cloud cover (the leading clouds, cirrus, are a good indicator of an impending change in the weather);
- long duration moderate rainfall; and
- shown as a line of red, semicircles on surface weather maps.

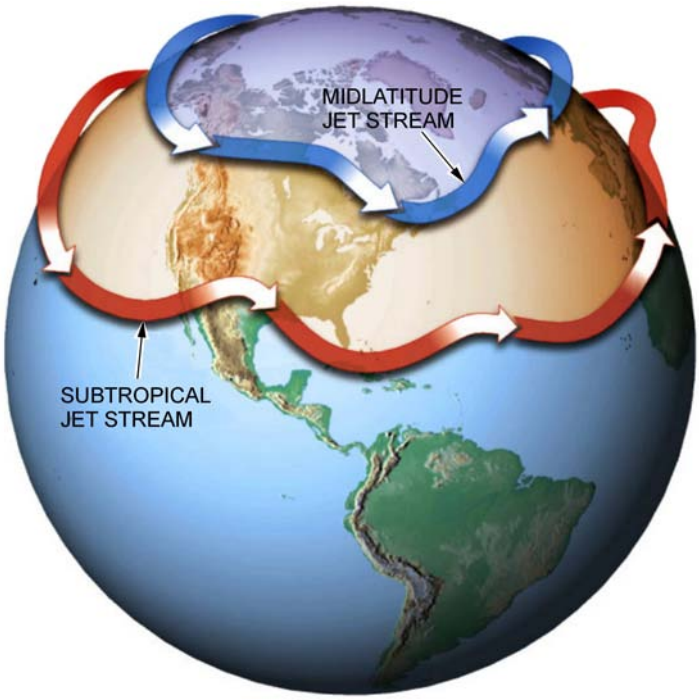


"Fronts", by The Atmosphere, Lutgens and Tarbuck, 8th Edition. Copyright 2001 by John Stimac. Retrieved November 19, 2007, from http://www.ux1.eiu.edu/~jpstimac/1400/fronts.html

Figure 1-15-5 Warm Front

Jet Streams. Fast flowing, relatively narrow air currents found in the atmosphere at around 11 km above the surface of the Earth. They form at the boundaries of adjacent air masses with significant differences in temperature, such as of the polar region and the warmer air to the south. The major jet streams are westerly winds (flowing west to east) in both the northern hemisphere and the southern hemisphere; this is due to the Coriolis effect caused by Earth's rotation. In general, winds are strongest in jet streams (except during tornadoes, hurricanes or other exceptional situations).

Jet streams are responsible for the weather patterns experienced in the northern hemisphere, bringing the cold air from the North Pole in the winter and warm air from the south in the summer. Jet streams have stronger winds in the winter when the temperature differences between the air masses are the largest.



"Circulation", by The Atmosphere, Lutgens and Tarbuck, 8th Edition. Copyright 2001 by John Stimac. Retrieved November 19, 2007, from http://www.ux1.eiu.edu/~jpstimac/1400/circulation.html

Figure 1-15-6 Jet Streams

"Circulation", by The Atmosphere, Lutgens and Tarbuck, 8th Edition. Copyright 2001 by John Stimac. Retrieved November 19, 2007, from http://www.ux1.eiu.edu/~jpstimac/1400/circulation.html

Figure 1-15-7 North American Jet Streams

Nature Signs. There are signs in nature that can show change in air pressure that can be used to forecast weather. Most of these are very obvious changes while others are of a more subtle nature. Birds and bats have a tendency to fly much lower to the ground right before a rain due to the "thinning" of the air. They prefer to fly

where the air is the densest and where they get greater lift for their wings. With high pressure and dry air, the atmosphere becomes denser and birds can easily fly at higher altitudes. Smoke rising from a fire straight into the air means fair weather (high pressure) and smoke hanging low (low pressure) means rain is on the way.

Senses. Mountains and other faraway objects will appear to be much closer and more sharply focused as wet weather approaches and the air pressure drops. The dust particles in the air begin to settle to the ground and the air clears allowing one to see more details of faraway objects. As a high-pressure front approaches and the air becomes thicker, more dust particles become suspended in air and things take on their normal hazy appearance.

Sound too becomes sharper and more focused prior to stormy weather. Instead of travelling upward and outward into the atmosphere, sound waves are bent back to the Earth and their range extended. Even birdcalls sound sharper. This is why some people think the air is clean and fresh and bird songs and calls sound sharper before a rain.

Red Sky. A red sky at either dusk or dawn is one of the more beautiful natural signs one can use to predict weather. At dusk, a red sky indicates that the next day probably will be a dry and fine day. This is due to the sun shining through dust particles being pushed ahead of a high pressure system bringing in dry air. A red sky at dawn often means that an approaching low pressure system is bringing in a lot of moisture. This is a fair indication that a storm is approaching. Do not confuse a red sky in the morning with a red sun in the morning. If the sun itself is red and the sky is a normal colour, the day will be fair.

Remember the old rhyme:

“Red sky at night, sailors delight. Red sky at morning, sailors take warning”

Being able to forecast weather using clouds is a great tool in a survival situation. Discuss the signs that the weather is going to change.

SIGNS OF BAD WEATHER

When the weather is going to change for the worse, cloud formations will change. Signs of change for bad weather are:

- Clouds, regardless of their formation are thicker (darker), increase in numbers or join together to form layers, and/or lower in elevation.
- Clouds form banks in the west with winds from the south.
- Clouds move in all directions or contrary to the ground wind.
- Altostratus clouds darken and lower.
- Altocumulus clouds move quickly across the sky or form towers in the morning.
- Cumulus clouds form in the morning and stack in the afternoon or move from the south or southwest.

A halo around the moon indicates bad weather.

SIGNS OF GOOD WEATHER

When the weather is going to change for the better, cloud formations will change. Signs of a change for good weather are:

- Cloud cover lifts, becomes lighter and small patches of blue sky develop.
- Cumulus clouds form in the afternoon or float alone.
- Stratocumulus clouds drift with the prevailing wind and remain scattered.
- The condensation trail (‘contrail’) left by high altitude aircraft disperses quickly.
- Morning fog is burnt off before noon.

As mentioned in TP 1, weather can also be predicted simply from knowing the type of cloud in the sky. Discuss the expected weather for each type of cloud.

Distribute handouts located at Annex X for each cadet.

HIGH CLOUDS	
Cirrus	Normally an indicator of fair weather.
Cirrocumulus	Expect precipitation in a day or two.
Cirrostratus	Predict fair weather.
MIDDLE CLOUDS	
Altocumulus	Normally seen before fair or bad weather. Have little value as an indicator of future weather developments.
Altostratus	Expect precipitation in 24 hours or less.
LOW CLOUDS	
Stratus	Expect drizzle, light rain or snow.
Stratocumulus	Snow or showers are possible and can be heavy.
Nimbostratus	Expect rain or snow.
CLOUDS OF VERTICAL DEVELOPMENT	
Cumulus	Expect fair weather, unless they begin to extend upwards.
Towering Cumulus	Expect showers. May develop into heavy ice or thunderstorms.
Cumulonimbus	Expect thunderstorms and showery conditions.

D Cdts 3, 2007, Ottawa, ON: Department of National Defence

Figure 1-15-8 Cloud Weather Signs

ACTIVITY

Time: 10 min

OBJECTIVE

The objective of this activity is to have the cadet predict weather conditions.

RESOURCES

- Pen or pencil, and
- Weather systems map over three time periods (one copy of each per cadet).

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

Sample of weather systems map is located at Annex Y.

1. Distribute handouts of local weather system maps over three time periods, for each cadet.
2. Have the cadets observe the changes over the three time periods, write down the changes that occurred and discuss the effects on weather in the local area, including:
   a. high and low pressure areas,
   b. cold and warm fronts, and
   c. the jet stream.
3. Divide the cadets into small groups, of no more than four and have them discuss weather predictions over the next few days based on the previous three time periods.

Follow up with the cadets' predictions in a few days time.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. What are the signs of cloud formation change for bad weather?

Q2. What are the two middle clouds and what weather can be predicted when they are seen in the sky?

Q3. What are some signs in nature that the weather is changing?

ANTICIPATED ANSWERS

A1. Signs of change for bad weather are:

- Clouds, regardless of their formation are thicker (darker), increase in numbers or join together to form layers, and/or lower in elevation.
- Clouds form banks in the west with winds from the south.
- Clouds move in all directions, or contrary to the ground wind.
- Altostratus clouds darken and lower.
- Altocumulus clouds move quickly across the sky or form towers in the morning.
- Cumulus clouds form in the morning and stack in the afternoon or move from the south or southwest.

A2.

MIDDLE CLOUDS	
Altocumulus	Normally seen before fair or bad weather. Have little value as an indicator of future weather developments.
Altostratus	Expect precipitation in 24 hours or less.

A3. Birds and bats have a tendency to fly much lower to the ground right before a rain due to the “thinning” of the air. They prefer to fly where the air is the densest and where they get greater lift for their wings. With high pressure and dry air, the atmosphere becomes denser and birds can easily fly at higher altitudes. Smoke rising from a fire straight into the air means fair weather (high pressure) and smoke hanging low (low pressure) means rain is on the way.

Teaching Point 3 **Discuss Wind-Chill, its Effect on Body Temperature, and Preventing Wind Chill**

Time: 10 min Method: Practical Activity

WIND CHILL

Wind Chill Temperature. The temperature it “feels like” outside and is based on the rate of heat loss from exposed skin caused by the effects of wind and cold. As the wind increases, the body is cooled at a faster rate causing the skin temperature to drop. Wind chill does not impact inanimate objects like car radiators and exposed water pipes, because these objects cannot cool below the actual air temperature.

Wind Chill and its Effect on Body Temperature

Anyone who has ever waited at a bus stop or taken a walk on a blustery winter day knows that the body feels colder when the wind blows. On a calm day, the body insulates from the outside temperature by warming up a thin layer of air close to the skin, known as the boundary layer. When the wind blows, it takes this protective layer away, exposing the skin to the outside air. It takes energy for the body to warm up a new layer and if each one keeps getting blown away, the skin temperature will drop, and it will feel colder. Wind also makes it feel

colder by evaporating any moisture on the skin, a process that draws more heat away from the body. Studies show that when the skin is wet, it loses heat much faster than when it is dry.

Preventing Wind Chill

Each year in Canada, more than 80 people die from over-exposure to the cold and many more suffer injuries from hypothermia and frostbite. Wind chill can play a major role in such health hazards because it speeds up the rate at which the body loses heat. The amount of heat lost depends not only on the wind chill, but on other factors as well. Good quality clothing with high insulating properties traps air, creating a thicker boundary layer around the body which keeps in the heat. Wet clothing or footwear loses its insulated value, resulting in body-heat loss nearly equal to that of exposed skin.

Body type also determines how quickly one loses heat. People with a tall slim build become cold much faster than those that are shorter and heavier. Body heat can be gained by increasing the metabolism or soaking up the sun. Physical activity, such as walking or skiing, increases the metabolism and generates more body heat. Age and physical condition also play a part: elderly people and children have less muscle mass, so they generate less body heat. Sunshine, even on a cold winter day, can also make a difference. Bright sunshine can make it feel as much as 10 degrees warmer. Over time the body can adapt to the cold, people who live in a cold climate are often able to withstand cold better than those from warmer climates.

According to Environment Canada, the coldest wind chill on record occurred at Kugaaruk, Nunavut, on January 13, 1975. On that day, the air temperature was -51 degrees Celsius, and the winds were 56 km/h, producing a wind chill of -78 degrees Celsius.

Wind Speed (km/h)	WHAT TO LOOK FOR	TEMPERATURE (°C) 0	-5	-10	-15	-20	-25	-30	-35	-40	-45
10	Wind felt on face; leaves rustle; wind vanes begin to move.	-3	-9	-15	-21	-27	-33	-39	-45	-51	-57
20	Leaves & small twigs constantly moving; small flags extended.	-5	-12	-18	-24	-30	-37	-43	-49	-56	-62
30	Dust, leaves, & loose paper lifted; large flags flap; small tree branches move.	-6	-13	-20	-26	-33	-39	-45	-52	-59	-65
40	Small trees begin to sway; large flags extend and flap.	-7	-14	-21	-27	-34	-41	-48	-54	-61	-68
50	Larger tree branches moving; whistling heard in power lines; large flags extend and flap more wildly.	-8	-15	-22	-29	-35	-42	-49	-56	-63	-69
60	Whole trees moving; resistance felt in walking against wind; large flags extend fully and flap only at the end.	-9	-16	-23	-30	-36	-43	-50	-57	-64	-71

WIND CHILL INDEX

"Wind Chill Fact Sheet", by Environment Canada. Copyright 2001 by Minister of Public Works and Government Services Canada. Retrieved November 19, 2007, from http://www.msc.ec.gc.ca/education/windchill/education_documents/fact_sheet_e.pdf

Figure 1-15-9 Wind Chill Chart

ACTIVITY

Time: 5 min

OBJECTIVE

The objective of this activity is to assist the cadets in understanding wind chill.

RESOURCES

- Fan, and
- Water.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

1. Turn on a fan and have the cadets stand in front of it.

The body will feel colder because of the wind cooling the skin, but the temperature in the room has not changed. The room cannot get any colder, no matter how high the fan is turned up without introducing a colder air mass. Similarly, no matter how strong the wind blows, the temperature of the air outside does not change.

2. Have the cadets dab some water on their skin and face.
3. Have the cadets stand in front of the fan and note how the water effects wind chill.

The wet skin will feel much colder than the dry. This demonstrates how important it is to stay dry when outdoors in high wind chills.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in this activity will serve as the confirmation of this TP.

Teaching Point 4 **Discuss Thunder and Lightning**

Time: 10 min Method: Interactive Lecture

THUNDERSTORMS AND LIGHTNING

Thunderstorms. Thunderstorms are most common in the summertime. They are formed by cumulus clouds feeding off warm and moist air. These clouds grow quickly during the day, driven by the heat from the sun. When dark cumulonimbus clouds begin to approach, one can expect a thunderstorm.

Lightning. Lightning is an electrical discharge in the atmosphere. When cumulus clouds grow tall, they develop an electrical field. The top of the cloud, where there are a lot of ice crystals, is normally positive. The bottom part of the cloud, filled with rain droplets, is normally negative. The ground has a positive charge. An electrical charge builds up and the atmosphere produces lightning.

Thunder. Thunder is the sound made when a lightning bolt heats the air and expands quickly. Since sound moves much slower than light, one can judge how far away a lightning bolt is by counting the seconds between seeing the flash and hearing the thunder. Each three-second interval equals approximately one km.

ACTIONS TO TAKE IN THE EVENT OF A THUNDERSTORM

A thunderstorm can arrive very fast and lightning can strike in front of the storm. Seek shelter well before the storm hits. The following is a list of facts and steps to take into consideration when in the presence of a thunderstorm.

Calculate the Speed of the Approaching Storm

Count the seconds between the flash and the thunder clap. Each second represents a 300-metre distance from the lightning strike. The speed and distance of the approaching storm can be calculated by comparing the time delay between the lightning and the thunder from several lightning strikes.

Compare the following data:

- Lightning Strike 1, time delay 5 seconds.
- Lightning Strike 2, time between 1 and 2, 15 seconds, time delay 4 seconds.
- Lightning Strike 3, time between 2 and 3, 15 seconds, time delay 3 seconds.
- Lightning Strike 4, time between 3 and 4, 15 seconds, time delay 1 seconds.

Distance to storm from data:

- Lightning Strike 1, 1500 m.
- Lightning Strike 2, 1200 m.
- Lightning Strike 3, 900 m.
- Lightning Strike 4, 300 m.

Speed of the storm:

Since most of the lightning occurs along the leading edge of a storm, it can be assumed that the strikes originated from a similar location. Between lightning Strikes 1 and 2 the storm travelled 300 m in 15 seconds. We can determine that the storm is travelling at 72 km/h by the following calculation:

- 300 m divided by 15 seconds = 20 metres per second (m/s).
- 20 multiplied by 3.6 = 72 k/h.

(1 m/s = 3.6 km/h)

This information reveals some information about the storm, especially at night. The faster the speed of the storm, the stronger the air pressure difference and the stronger the storm.

Avoid High Points

Make sure to not be the prominent high point in the area (in a field, on a beach, in the water) and not next to a prominent high point (next to an isolated tree, steeple, flag pole).

Avoid Running

Walk fast, but do not run as rapid movement can cause air currents that might attract an electric strike.

Stay Low in Open Areas

If in the open, crouch very low and try to insulate the body from the ground by standing on a backpack (with no metal), raincoat, jacket or sleeping bag. The importance of this insulation is that the ground charge cannot rise through the body to attempt to reach the lightning discharge.

Keep hands off the ground especially if the ground is wet or if it is humid.

Avoid Metal Objects

Stay away from any metal tent poles, metal backpack frames, metal walking poles, etc. Abandon these items, in a flat field, as they might create a better potential impact point other than the body. Avoid being in a boat or in the water during a storm.

Avoid Grouping Together

Do not group together during a storm. According to P. Tawrell, *Camping and Wilderness Survival: The Ultimate Outdoors Book*, Paul Tawrell, p. 224, “a flash of lightning killed 504 sheep that had huddled together during a storm”.

Make sure that the storm has completely passed and that you do not attract the last lightning strike.

CONFIRMATION OF TEACHING POINT 4

QUESTIONS

Q1. Why should you not run in the presence of a thunderstorm?

Q2. What should you do in an open field when a thunderstorm is approaching?

Q3. How do you calculate the approaching speed/distance of a thunderstorm?

ANTICIPATED ANSWERS

A1. Because rapid movement can cause air currents that might attract an electric strike.

A2. Make sure you are not the prominent high point in the area or that you are not next to a prominent high point. Crouch very low and try to insulate the body from the ground by standing on a backpack (with no metal), raincoat, jacket, sleeping bag. The importance of this insulation is that the ground charge cannot rise through the body to attempt to reach the lightning discharge. Keep your hands off the ground especially if it is humid. Do not group together during the storm.

A3. Count the seconds between the flash and the thunder clap. Each second represents a 300-metre distance from the lightning strike. The speed and distance of the approaching storm can be calculated by comparing the time delay between the lightning and the thunder from several lightning strikes.

END OF LESSON CONFIRMATION

The cadets' participation in predicting weather conditions will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

Being able to use the clouds to predict weather is a great tool when in a survival situation and when in the field. Weather is an important aspect of planning in any survival situation with respect to the type of shelter selected and the best course of action to take.

INSTRUCTOR NOTES/REMARKS

The principles discussed during this class should be discussed throughout the course as the weather changes.

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MAIN TEACHING POINTS REVIEW WORKSHEET

TP1 Stage 1: Concrete Experience: Cadets have an experience and take time to identify and define what the experience was.

Example: The cadets experienced the emotions and stresses of being in the bush, alone, and at night. They then identified and defined what they experienced.

TP2 Stage 2: Reflective Observation: Cadets reflect upon and examine what they saw, felt and thought while they were having the experience.

Example: The cadets reflected on the experience, examining their emotions and how they dealt with them. For many the experience was a stressful one.

TP3 Stage 3: Abstract Conceptualization: Cadets work to understand and make connections from the experience to new or different situations.

Example: The cadets used their past experiences, with a review of a past survival psychology lesson, to make connections in order to analyze and learn from the experience.They also considered how the situation would have been different if they had not been alone.

TP4 Stage 4: Active Experimentation: Cadets look ahead to, and plan for, the application of skills and knowledge acquired to future experiences.

Example: After looking back at their experience and what they could have done differently, the cadets actively imagine and then planned for future survival situations.

GROUND-TO-AIR SIGNALS

Message	Symbol
REQUIRE ASSISTANCE	V
REQUIRE MEDICAL ASSISTANCE	X
PROCEEDING IN THIS DIRECTION	↑
ALL IS WELL	LL
REQUIRE FOOD AND WATER	F

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Figure 1B-1 Ground-to-Air Signals

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NUTRITION BREAKDOWN

Insect (per 100 g)	Protein (g)	Fats (g)	Carbohydrates (g)	Calcium (mg)	Iron (mg)
Crickets	**12.9**	**5.5**	**5.1**	**75.8**	**9.5**
Small Grasshoppers	**20.6**	**6.1**	**3.9**	**35.2**	**5.0**
Giant Water Beetles	**19.8**	**8.3**	**2.1**	**43.5**	**13.6**
Red Ants	**13.9**	**3.5**	**2.9**	**47.8**	**5.7**
Silkworm Pupae	**9.6**	**5.6**	**2.3**	**41.7**	**1.8**
Termites	**14.2**	**N/A**	**N/A**	**0.050**	**35.5**
Weevils	**6.7**	**N/A**	**N/A**	**0.186**	**13.1**

G. Davenport, Wilderness Survival, Stackpole Books (p. 161)

Figure 1C-1 Nutritional Value

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COMMON POISONOUS PLANTS

"Poisonous Plants", Government of Canada. Retrieved November 15, 2007, from http://cbif.gc.ca/pls/pp/ppack.jump?p_null=illust&p_type=list&p_sci=comm&p_x=px

Figure 1D-1 Poison Ivy

"Poisonous Plants", Government of Canada. Retrieved November 15, 2007, from http://cbif.gc.ca/pls/pp/ppack.jump?p_null=illust&p_type=list&p_sci=comm&p_x=px

Figure 1D-2 Poison Oak

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COMMON POISONOUS PLANTS

"Poisonous Plants", Government of Canada. Retrieved November 15, 2007, from http://cbif.gc.ca/pls/pp/ppack.jump?p_null=illust&p_type=list&p_sci=comm&p_x=px

Figure 1E-1 Castor Bean

"Poisonous Plants", Government of Canada. Retrieved November 15, 2007, from http://cbif.gc.ca/pls/pp/ppack.jump?p_null=illust&p_type=list&p_sci=comm&p_x=px

Figure 1E-2 Death Camas

"Poisonous Plants", Government of Canada. Retrieved November 15, 2007, from http://cbif.gc.ca/pls/pp/ppack.jump?p_null=illust&p_type=list&p_sci=comm&p_x=px

Figure 1E-3 Oleander

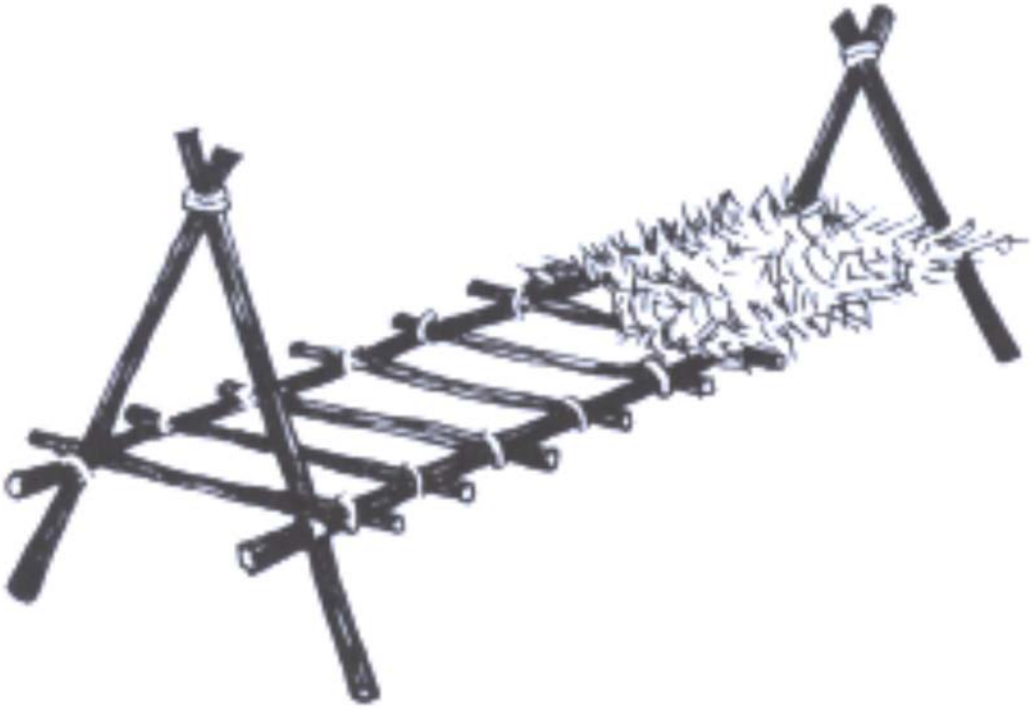
"Poisonous Plants", Government of Canada. Retrieved November 15, 2007, from http://cbif.gc.ca/pls/pp/ppack.jump?p_null=illust&p_type=list&p_sci=comm&p_x=px

Figure 1E-4 Poison Hemlock

LADDER BED

Using natural resources and cord, a ladder bed can be constructed. Steps to constructing a ladder bed:

1. Collect the natural resources, including:
    a. four poles 75–100 cm long to construct the A-frames,
    b. two sturdy poles approximately 180 cm long to make the frame. Length will depend on the height of the person, and
    c. several cross pieces 50–60 cm long, the springier the better; number will depend on the size of the person.
2. Construct two A-frame supports using round lashings.
3. Attach the two frame poles to the A-frames, ensuring that the knots and wood are strong and will hold the weight of the individual.
4. Tie the cross pieces making a ladder along the frame.
5. Lay a bedding of boughs, leaves or moss, as desired. Ensure there is enough material to prevent heat being transferred away from the body during the night.



J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 309)

Figure 1F-1 Ladder Bed

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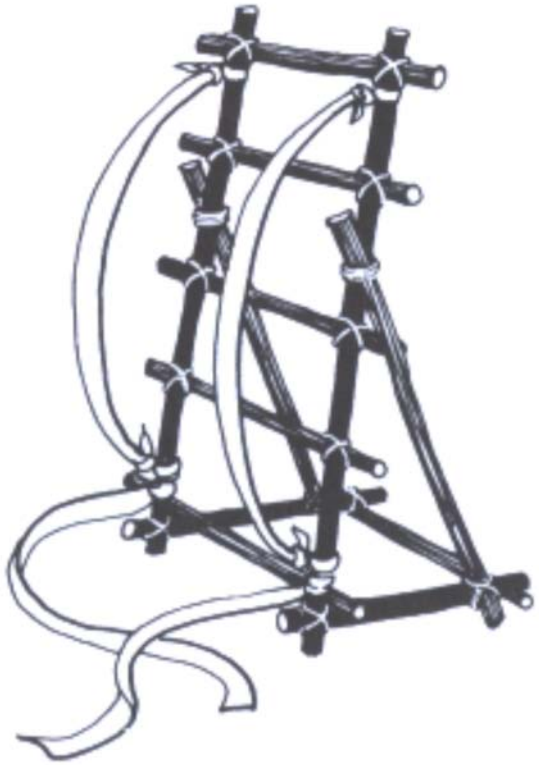
PACK FRAME

Using natural resources, cord and two straps, a pack frame can be constructed. Steps to constructing a pack frame:

1. Collect natural resources, including:
    a. two poles to make the frame 75–100 cm long, (length will depend on the height of the person),
    b. several cross pieces 50–60 cm long, (length and number will depend on the size of the person),
    c. five pieces (two 15–20 cm long , two 50 cm long and one 50–60 cm long) to construct the right angle projection at the bottom.
2. Construct the ladder frame to the size of the individual.
3. Construct the right angle projection at the bottom and ensure the knots and wood are strong and will not break with a load.
4. Attach straps made from cord or from improvisation and adjust it to a comfortable position.



J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 372)

Figure 1G-1 Pack Frame

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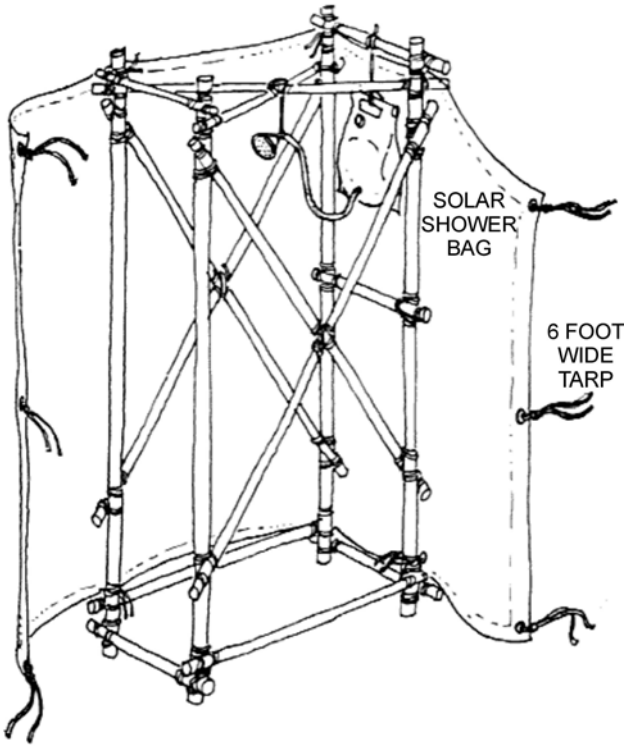
SHOWER

Using natural resources, cord, a large tarp and a shower bag or bucket; a camp shower can be constructed. Steps to constructing a shower:

1. Collect the natural resources, including:
   a. four poles at least 180 cm in length, but may depend on the height of the person,
   b. several poles for supports, (number and length will depend on the size of the shower being constructed and the strength of the material being used),
   c. a tarp at least 180 cm in width and 240 cm in length, and
   d. a shower bag or a bucket
2. Lash the four poles at least to a square base frame and a cross-frame top.
3. Add cross braces on two sides of the shower for support, remembering to leave one side open for accessibility.
4. Tie a large tarp with grommets to the outside of the frame and rig a latch on the open side**.**
5. Attach the shower bag or bucket to the top of the frame.



www.pioneeringprojects.org/pionnering.htm. Copyright 2001 by PioneeringProjects.org. Retrieved November 17, 2007, from http://www.pioneeringprojects.org/images/pioneering/Shower.JPG

Figure 1H-1 Shower

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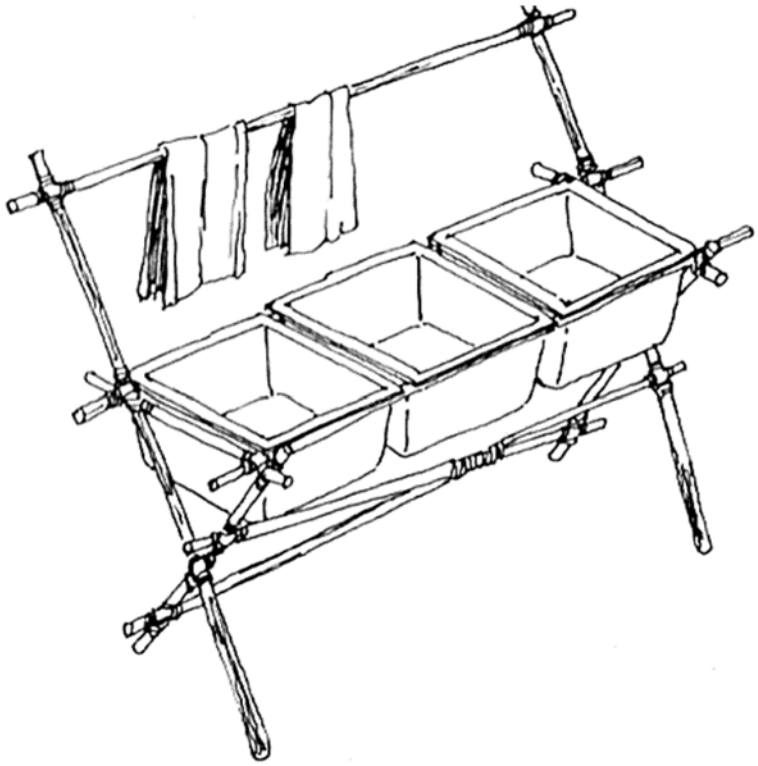
WASHSTAND

Using natural resources, cord and several wash basins or tubs, a washstand can be constructed. Steps to constructing a washstand:

1. Collect the natural resources, including:
    a. four poles to construct the table top, (the dimensions will depend on the size and number of wash basins the washstand is being constructed for),
    b. four poles to construct the stand, two poles 180 cm in length and two 120 cm in length, and
    c. two poles the length of the washstand to form a cross-brace at the bottom.
2. Start by constructing a box frame for the wash basins to sit in using square lashings; use the wash basin as a measuring tool.
3. Lash two sets of poles (one pole 180 cm and the other 120 cm long) using square lashings to form the stand.
4. Lash the table top to the sides and add supports as necessary.



www.pioneeringprojects.org/pionnering.htm. Copyright 2001 by PioneeringProjects.org. Retrieved November 17, 2007, from http://www.pioneeringprojects.org/images/pioneering/Washstand.JPG

Figure 1I-1 Washstand

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DRYING RACK

Using natural resources and cord, a drying rack can be constructed. Steps to constructing a drying rack:

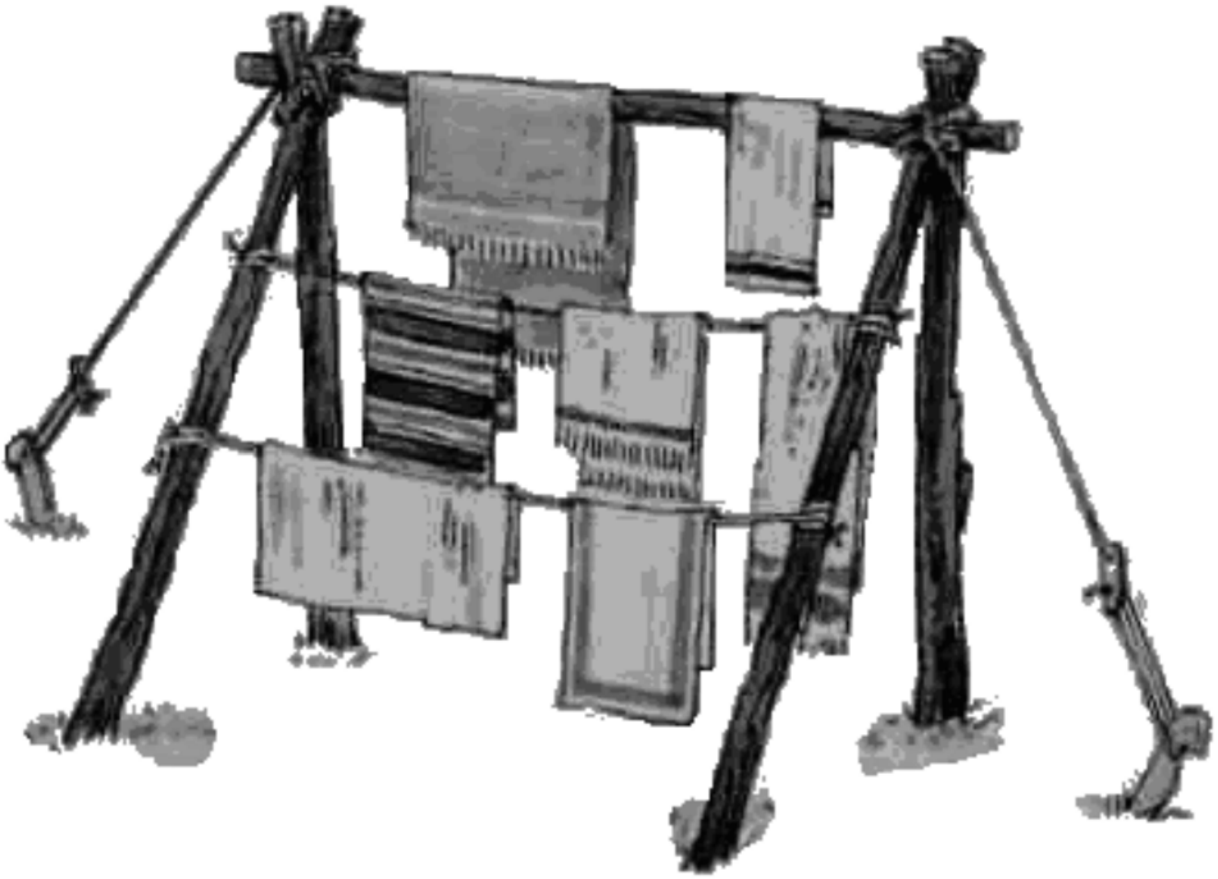
1. Collect six poles 180 cm in length to construct two tripods.
2. Start by driving two uprights (piece of wood) into the ground and then lash a crosspiece of cord to join them across the top.
3. To ensure the structure is sturdy add further poles lashed at an angle to form a simple ’A’ frame at either end.
4. Attach guy wires to the two ends and peg out to keep the clothes rack on the ground in high winds. Add extra drying lines by lashing cord across the uprights.

Dry clothing is essential in a survival situation to avoid exposure and possible hypothermia.

www.pioneeringprojects.org/pionnering.htm. Copyright 2001 by PioneeringProjects.org. Retrieved November 17, 2007, from http://www.pioneeringprojects.org/images/pioneering/Dryingrack.JPG

Figure 1J-1 Drying Rack 1

Another option (as illustrated in Figure 1J-2) is to build the entire frame out of wood.



www.pioneeringprojects.org/pionnering.htm. Copyright 2001 by PioneeringProjects.org. Retrieved November 17, 2007, from http://www.pioneeringprojects.org/images/pioneering/Washstand.JPG

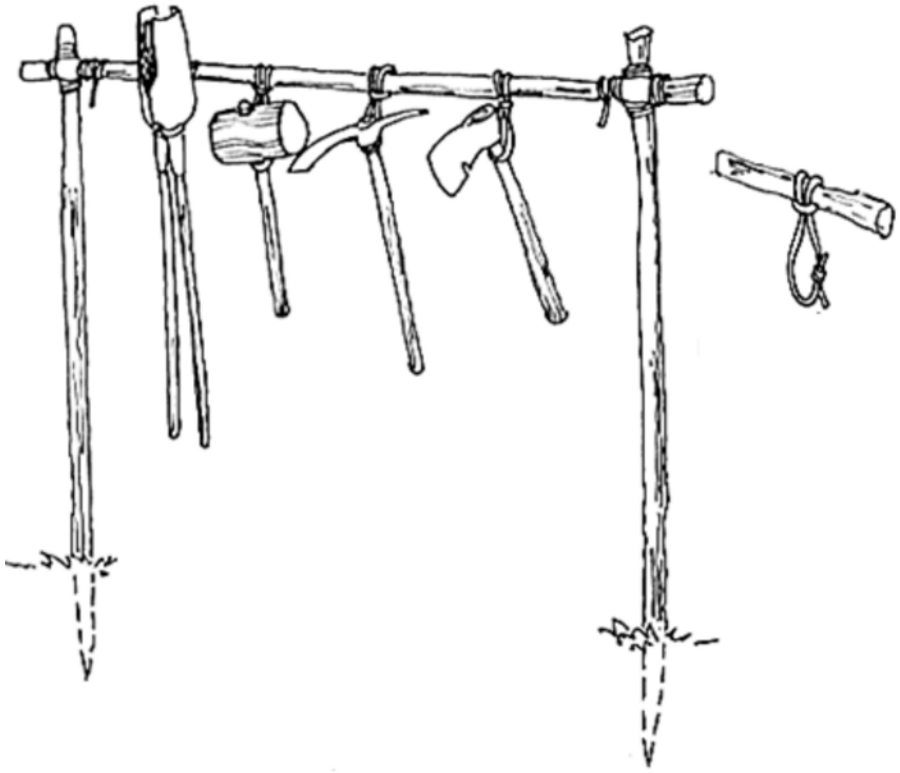
Figure 1J-2 Drying Rack 2

TOOL RACK

Using natural resources and cord, a tool rack can be constructed. Steps to constructing a tool rack:

1. Collect the three poles 180 cm long from natural resources.
2. Start by driving two uprights into the ground or use two trees.
3. Lash a ridge pole between the two uprights to hang the tools from.
4. Tie pieces of cord into a loop using a reef knot and then loop it over the ridge pole (as illustrated in Figure 1K-1).

A tool rack will keep tools off of the ground and prevent them from rusting or becoming dull too quickly. By having tools kept in one place they are less likely to go missing and site safety is increased.



www.pioneeringprojects.org/pionnering.htm. Copyright 2001 by PioneeringProjects.org. Retrieved November 17, 2007, from http://www.pioneeringprojects.org/images/pioneering/Washstand.JPG

Figure 1K-1 Tool Rack 1

Another example (as illustrated in Figure 1K-2) has two crosspieces of wood for increased stability.

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Figure 1K-2 Tool Rack 2

CAMP CRAFTS FOR COOKING

Pot Rod

Using natural materials, cord and a pot, a pot rod for cooking over a fire can be constructed. Steps to constructing a pot rod:

1. Collect the natural resources, including:
   a. one pole 180 cm long, and
   b. two forked sticks, match size and shape to the pole.
2. Drive a forked stick into the ground near the fire, so that the forked part is facing down (as illustrated in Figure 1L-1). Be careful in the placement so it does not catch on fire.
3. Pile rocks on the fire side of the forked stick and insert a long pole between the forked stick and the rocks so that the end is over the fire; add rocks to achieve the desired height.
4. Secure the pot by either lashing another forked stick (as illustrated in Figure 1L-1) or by notching a groove so the handle stays in one spot.

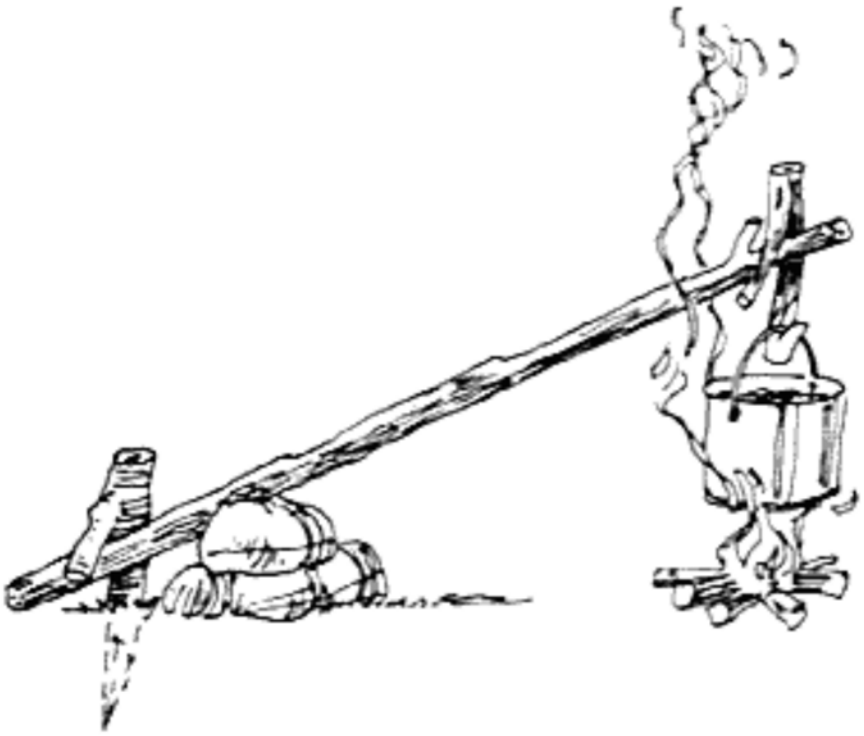

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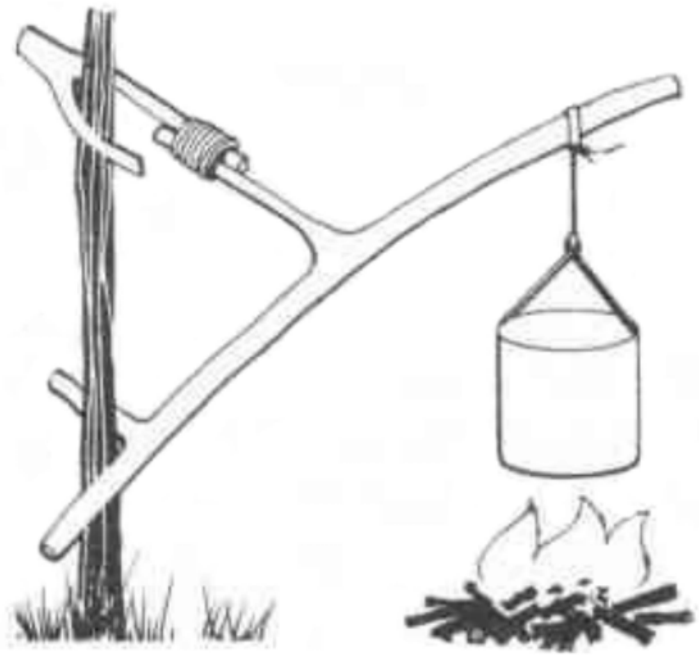
Figure 1L-1 Pot Rod

Swinging Pot Holder

Using natural materials, cord and a pot, a swinging pot holder for cooking over a fire can be constructed. A swinging pot holder is an extremely useful version of the simple pot rod. Steps to constructing a swinging pot holder:

1. Collect the natural resources, including:
   a. one pole 150 cm long, with a forked end and another fork at the midway point,
   b. one pole 90 cm long for an upright, and
   c. one short stick with a fork (as illustrated in Figure 1L-2).
2. Drive the 90-cm long upright 15 cm into the ground.
3. Lash the two forked sticks so that the forks fit in opposite directions on the upright. This will produce a cantilever action which not only maintains the height that it is set at, but will also swing freely allowing the pot to move away from the flames. Note that with a longer upright, the cooking height can be better controlled.
4. Secure the pot by either lashing another forked stick (as illustrated in Figure 1L-2) or by notching a groove so the handle stays in one spot.



J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 288)

Figure 1L-2 Swinging Pot Holder

Chippewa Kitchen

Using natural materials and cord, a Chippewa kitchen for cooking over a fire can be constructed. A challenging camp craft, but a nice set-up for long-term cooking, the Chippewa kitchen (as illustrated in Figure 1L-3) is constructed by the following steps:

1. Collect the natural resources, including:
    a. eight straight poles 240 cm long and 4 cm thick,
    b. four straight poles 50 cm long and 4 cm thick, and
    c. poles 50-cm long to create a table top.
2. Using round lashings and four 240 cm poles, lash two sets of 'A' frames.
3. Lash two 50 cm poles to each of the 'A' frames for support.
4. Lash the two 'A' frames together with the remaining four 240-cm poles (as illustrated in Figure 1L-3).
5. Add poles to create a table top.

Scale the kitchen to available materials or conditions as appropriate.

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Figure 1L-3 Chippewa Kitchen

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WHEELBARROW

Using natural materials and cord, a wheelbarrow can be constructed. A wheelbarrow is a tool that assists in gathering firewood or moving heavy objects around a survival site. Steps to constructing a wheelbarrow:

1. Collect the natural resources, including:
    a. two poles 60–100 cm long,
    b. two poles for crosspieces,
    c. one cross-section of a log approximately 15 cm in diameter and 4 cm thick, and
    d. one rod matched to the size of the hole.
2. Construct the wheel from a cross-section of a small tree that has been bored out and a rod to create an axle. The wheel portion can take a lot of time to create depending on available tools.
3. Insert a rod that has been shaped to fit into the hole.
4. Make a notch into each of the longer poles to match the diameter of the rod.
5. Tightly lash the two poles with a cross piece as close to the wheel as possible. This crosspiece will hold the wheel in place and must be very tight.
6. Lash another crosspiece near the top of the two poles for support.
7. Add other crosspieces if necessary.

ropesandpoles.blogspot.com, Copyright 2007 by Google.com, Inc. Retrieved November 18, 2007, from http://ropesandpoles.blogspot.com/2006/01/camp-wheelbarrow.html

Figure 1M-1 Wheelbarrow

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COAT HANGER

Using natural materials and cord, a coat hanger can be constructed. Good for using on a drying rack, the coat hanger is one of the easier crafts to construct. Steps to constructing a coat hanger:

1. Collect the natural resources, including**:**
   a. one slightly bent pole 60 cm long, and
   b. one forked stick approximately 15 cm long or a bent stick approximately 30 cm long.
2. Lash either a forked stick or (as illustrated in Figure 1N-1), to the slightly bent pole.

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Figure 1N-1 Hanger

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SIMPLE BENCH

Using natural materials and cord, a bench can be constructed. A simple bench can double as a tool storage area or a work bench. Steps to constructing a simple bench:

1. Collect the natural resources, including:
   a. six sturdy logs approximately 100 cm long and 15 cm thick, and
   b. one sturdy log approximately 150 cm long and 15 cm thick.
2. Using round lashings, create two tripods frames.
3. Attach a sturdy log to the tripod frames to sit on.

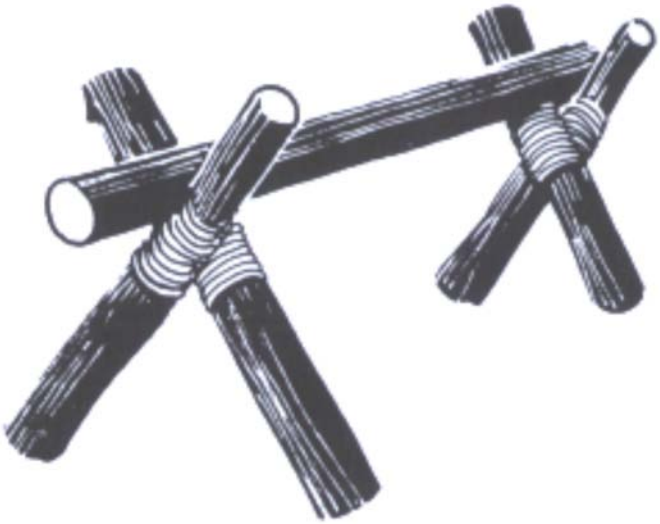

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Figure 1O-1 Simple Bench

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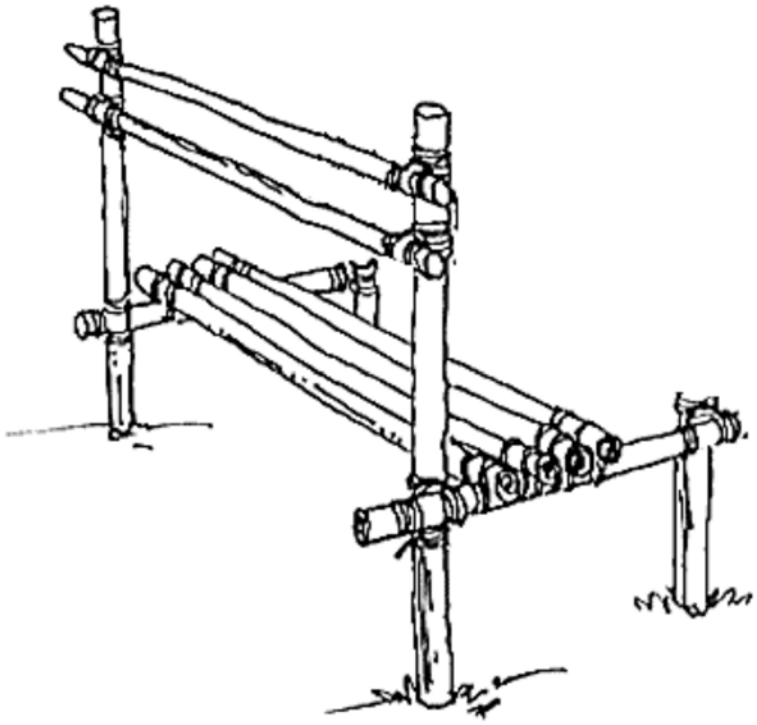
BENCH WITH BACK REST

Another example of a bench (as illustrated in Figure 1P-1) uses more poles and has a back rest. Steps to constructing a bench with a back rest:

1. Collect the natural resources, including:
   a. eight poles approximately 2 m each,
   b. two poles approximately 1 m each, and
   c. two poles approximately 0.5 m each.
2. Begin by constructing the sitting portion of the bench by attaching four long pieces of wood to the 1 m pieces, using square lashings.
3. Drive the two long and two short pieces of wood that will be used as the legs of the bench into the ground.
4. Lash the sitting portion onto the legs, using square lashings.
5. Construct the back rest using square lashings and attach it to the long legs in the ground.



www.pioneeringprojects.org/pionnering.htm. Copyright 2001 by PioneeringProjects.org. Retrieved February 20, 2007, from from http://www.pioneeringprojects.org/projects/index.htm

Figure 1P-1 Bench with Back Rest

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CAMP TABLE 1

Using natural materials and cord a table can be constructed (as illustrated in Figure 1Q-1). Steps to constructing a camp table:

1. Collect the natural resources, including:
    a. four poles approximately 3 m long,
    b. six poles approximately 2 m long,
    c. two poles approximately 1.5 m long, and
    d. fourteen poles approximately 0.5 m long.
2. Construct a figure-of-eight lashing around the four long pieces of wood, to make an A-frame.
3. Construct the table top, using square lashings.
4. Attach the table top portion to the long poles, using square lashings.
5. Make the sitting portion using square lashings and attach it to the long poles using square lashings.

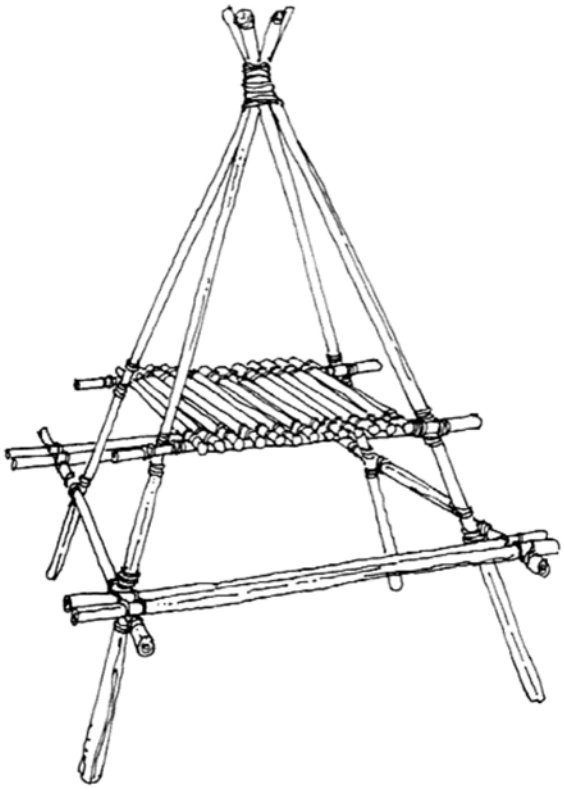

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Figure 1Q-1 Camp Table 1

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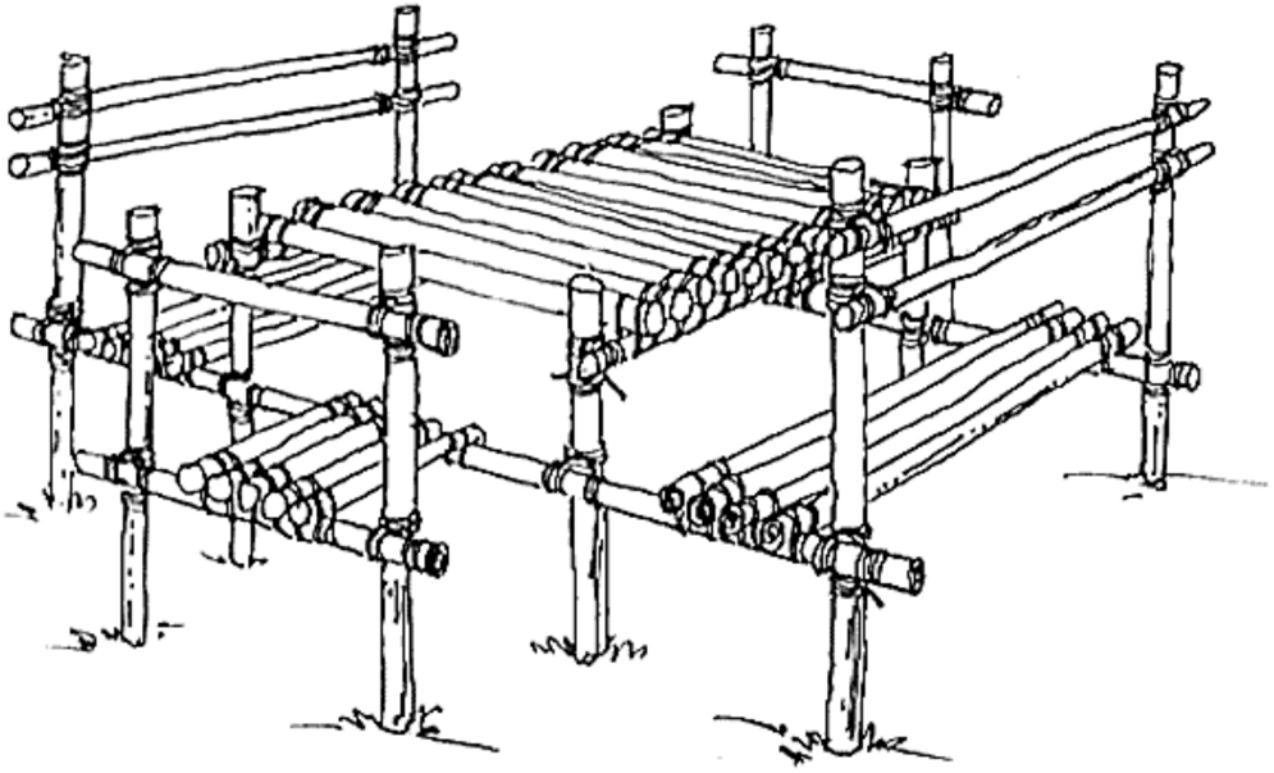
CAMP TABLE 2

An alternative to Camp Table 1, this camp table is a combination of the steps in Bench with a Back Rest combined with a variation of the steps in Camp Table 1. Steps to constructing Camp Table 2:

1. Collect the natural resources, including:
    a. thirty poles approximately 1 m long,
    b. fourteen poles approximately 2 m long,
    c. two poles approximately 3 m long, and
    d. ten poles approximately 0.5 m long.
2. Begin by constructing the table lashing together the four 1-metre uprights with two 1-metre poles and two 2-metre poles.
3. Add twelve 1-metre poles as a table top.
4. Lash the two 3-metre poles to either end of the table using square lashings.
5. Lash the four 1-metre uprights to the end of the 3-metre poles using square lashings to each end.
6. Lash eight 2-metre long poles to the seat and two 2-metre long poles to form the backrest.
7. Lash the five 0.5-metre poles to the sides of the table and lash a 1-metre long pole to the other end. Repeat on the other side.
8. Then using the 1-metre long pole from Step 7, lash two 1-metre uprights using square lashings. Repeat on the other side.
9. Finish the end seats by lashing the final 1-metre long pole to the top to form a backrest. Repeat on the other side.

This elaborate camp craft can take many hours to build, a lot of personnel and resources are required.



www.pioneeringprojects.org/pionnering.htm. Copyright 2001 by PioneeringProjects.org. Retrieved November 17, 2007, from http://www.pioneeringprojects.org/images/pioneering/CampTable.JPG

Figure 1R-1 Camp Table 2

CAMP TABLE 3

Using natural materials and cord another example of a camp table (as illustrated in Figure 1S-1).

1. Collect the natural resources, including:
   a. two poles approximately 2 m long,
   b. two poles approximately 2.5 m long,
   c. two poles approximately 3 m, and
   d. poles approximately 0.5 m long to create the table top.
2. Start by lashing the two 2-metre pole to make two 'A' frames.
3. Lash a cross-brace the two 'A' frames using two 3-metre poles.
4. Lash the two 2.5-metre poles to the frame to form the table top.
5. Add poles to the table top to complete the structure.

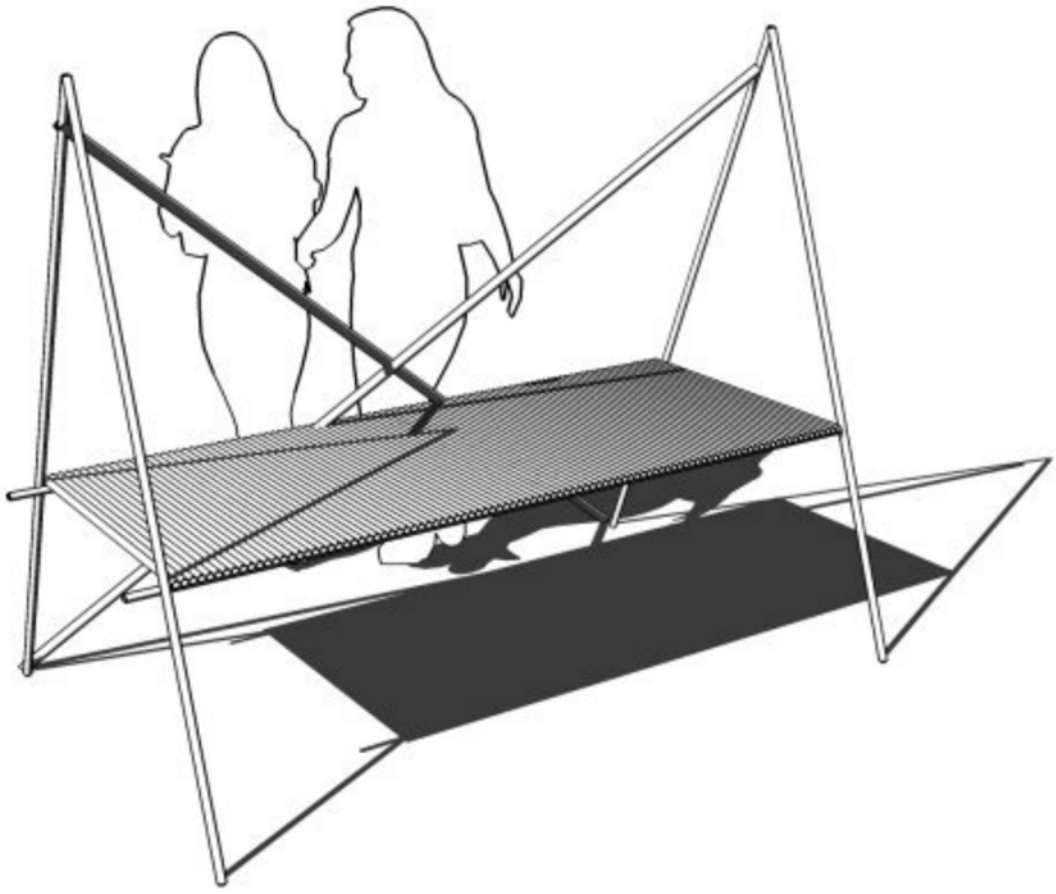


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Figure 1S-1 Camp Table 3

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FRICTION LOCK TABLE

Using natural resources and cord, a friction lock table can be constructed. This table only uses one piece of cord (as illustrated in Figure 1T-1). Friction locks the whole table together. There is one rope stopping the entire thing from spreading out and falling apart, running across the table (from left to right, under the table top). No lashings are used at all in this construction.

Steps to constructing a friction lock table:

1. Collect the natural resources, including:
    a. four poles 180 cm in length and at least 15 cm thick, all poles used to construct this table should be of the same thickness to ensure a proper fit,
    b. six poles 120 cm in length and at least 15 cm thick, and
    c. natural materials to construct the tabletop.
2. Lay out the four parallel poles (the ones pointing towards the screen (as illustrated in Figure 1T-1) and tie together with clove hitches on each pole.
3. Lifting the two centre poles that were just tied, place the two cross-poles under these but over the outside poles.
4. Place natural materials or a piece of plywood to make a table top.
5. Lift the table (by the two outside tied poles) and hold up while the legs are inserted.

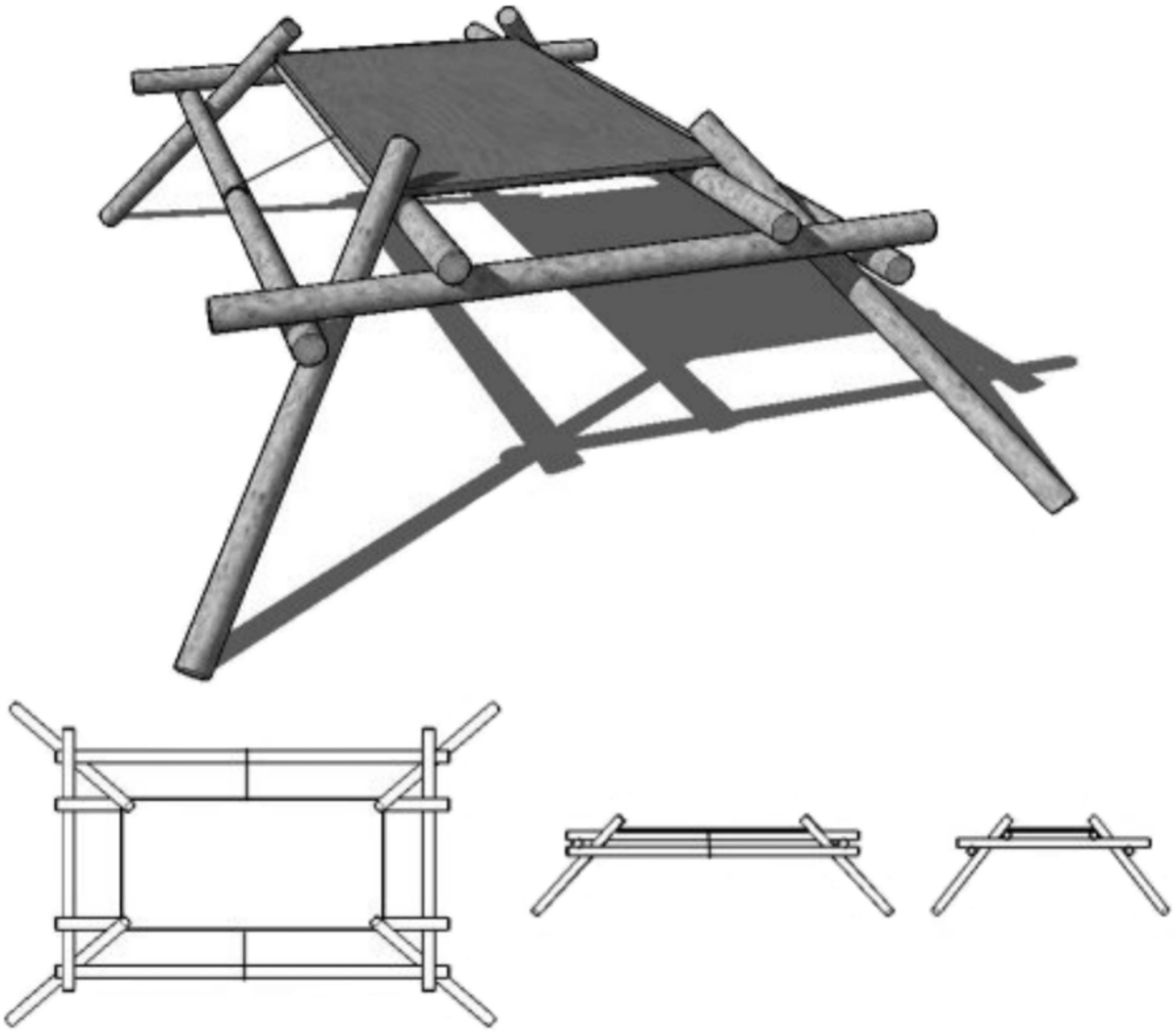

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Figure 1T-1 Friction Lock Table

CLOUD PHOTOS

"Victoria Weather", by UVic, 2007, School-Based Weather Station Network. Retrieved November 1, 2007, from http://www.victoriaweather.ca/clouds

Figure 1U-1 Cirrus Cloud

"Victoria Weather", by UVic, 2007, School-Based Weather Station Network. Retrieved November 1, 2007, from http://www.victoriaweather.ca/clouds

Figure 1U-2 Cirrocumulus Cloud

E. Brotak, Wild About Weather, Lark Books, A Division of Sterling Publishing Co., Inc. (p. 87)

Figure 1U-3 Cirrostratus Clouds

"Victoria Weather", by UVic, 2007, School-Based Weather Station Network. Retrieved November 1, 2007, from http://www.victoriaweather.ca/clouds

Figure 1U-4 Altocumulus Cloud

E. Brotak, Wild About Weather, Lark Books, A Division of Sterling Publishing Co., Inc. (p. 87)

Figure 1U-5 Altostratus

"Victoria Weather", by UVic, 2007, School-Based Weather Station Network. Retrieved November 1, 2007, from http://www.victoriaweather.ca/clouds

Figure 1U-6 Stratus Cloud

"Victoria Weather", by UVic, 2007, School-Based Weather Station Network. Retrieved November 1, 2007, from http://www.victoriaweather.ca/clouds

Figure 1U-7 Stratocumulus Cloud

"Victoria Weather", by UVic, 2007, School-Based Weather Station Network. Retrieved November 1, 2007, from http://www.victoriaweather.ca/clouds

Figure 1U-8 Nimbostratus Cloud

"Victoria Weather", by UVic, 2007, School-Based Weather Station Network. Retrieved November 1, 2007, from http://www.victoriaweather.ca/clouds

Figure 1U-9 Cumulus Cloud

E. Brotak, Wild About Weather, Lark Books, A Division of Sterling Publishing Co., Inc. (p. 88)

Figure 1U-10 Towering Cumulus

E. Brotak, Wild About Weather, Lark Books, A Division of Sterling Publishing Co., Inc. (p. 89)

Figure 1U-11 Cumulonimbus From Ground

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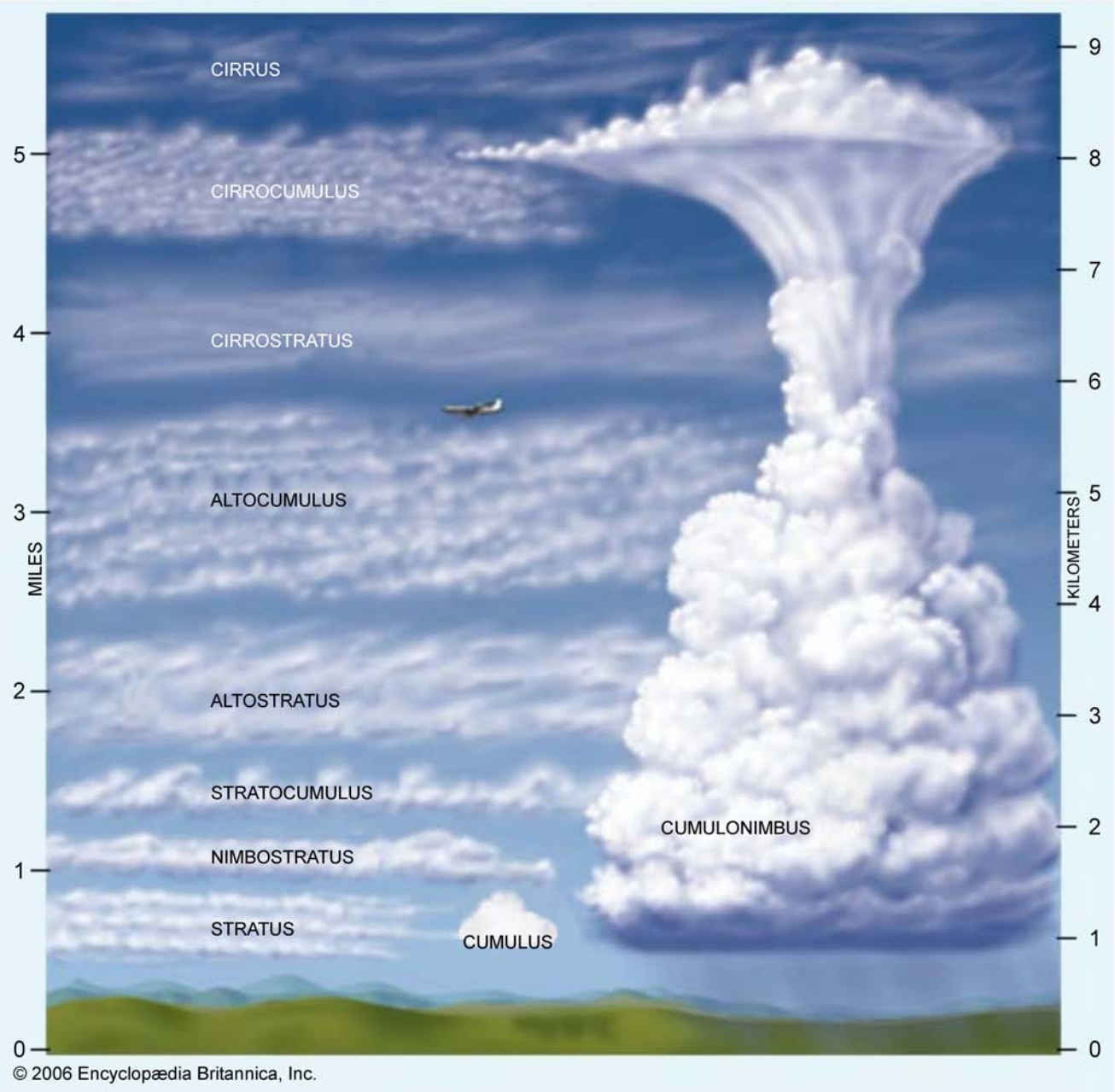
Figure 1U-12 Cumulonimbus From Sky

COMMON TYPES OF CLOUDS



"Cumulus Cloud", by Encyclopaedia Britannica, Inc, 2006, Encyclopaedia Britannica Online, Copyright 2006 by Encyclopaedia Britannica, Inc. Retrieved, November 21, 2007, from http://cache.eb.com/eb/image?id=93302&rendTypeId=34

Figure 1V-1 Common Types of Clouds

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COMMON CLOUD DESCRIPTIONS

Cloud name	Cloud family	Cloud description
Cirrus	High	High, thin, wispy clouds blown by high winds into long streamers. Cirrus clouds usually move across the sky from west to east. They generally indicate pleasant weather.
Cirrocumulus	High	Appears as small, rounded white puffs. The small ripples in the cirrocumulus sometimes resemble the scales of a fish. A sky with cirrocumulus clouds is sometimes referred to as a "mackerel sky."
Cirrostratus	High	These clouds are white sheets that completely cover the sky. Cirrostratus clouds are normally see-through. When these clouds are in the sky, one can expect precipitation in a day or two.
Altocumulus	Middle	Appear as grey, puffy masses, sometimes rolled out in parallel waves or bands. The appearance of these clouds on a warm, humid summer morning often means thunderstorms will occur by late afternoon.
Altostratus	Middle	A grey or blue-grey layer cloud that typically covers the entire sky. In the thinner areas of the cloud, the sun may be dimly visible as a round disk. This cloud appears lighter than stratus clouds.
Stratus	Low	Uniform grey layer cloud that often covers the entire sky. They resemble fog that does not reach the ground. Usually no precipitation falls from stratus clouds, but sometimes they may drizzle.
Nimbostratus	Low	Dark grey layer clouds associated with continuously falling rain or snow. They often produce precipitation that is usually light to moderate.
Stratocumulus	Low	A series of rounded mass that form a layer cloud. This type of cloud is usually thin enough for the sky to be seen through breaks.
Cumulus	Vertical Development	Puffy thick, rounded, and lumpy clouds. They sometimes look like pieces of floating cotton. They usually have flat bases and rounded tops.
Towering Cumulus	Vertical Development	These clouds build up into high towering masses. They have puffy, white tops but very dark bottoms. Towering cumulus clouds can produce showers and may develop into heavy ice or thunderstorms.
Cumulonimbus	Vertical Development	Thunderstorm clouds that form if cumulus clouds continue to build. Violent vertical air currents, hail, lightning, and thunder are associated with the cumulonimbus clouds.

D Cdts 3, 2007, Ottawa, ON: Department of National Defence

Figure 1W-1 Common Descriptions

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CLOUD WEATHER SIGNS

HIGH CLOUDS	
Cirrus	Normally an indicator of fair weather.
Cirrocumulus	Expect precipitation in a day or two.
Cirrostratus	Predict fair weather.
MIDDLE CLOUDS	
Altocumulus	Normally seen before fair or bad weather. Have little value as an indicator of future weather developments.
Altostratus	Expect precipitation in 24 hours or less.
LOW CLOUDS	
Stratus	Expect drizzle, light rain or snow.
Stratocumulus	Snow or showers are possible and can be heavy.
Nimbostratus	Expect rain or snow.
CLOUDS OF VERTICAL DEVELOPMENT	
Cumulus	Expect fair weather, unless they begin to extend upwards.
Towering Cumulus	Expect showers. May develop into heavy ice or thunderstorms.
Cumulonimbus	Expect thunderstorms and showery conditions.

D Cdts 3, 2007, Ottawa, ON: Department of National Defence

Figure 1X-1 Cloud Weather Signs

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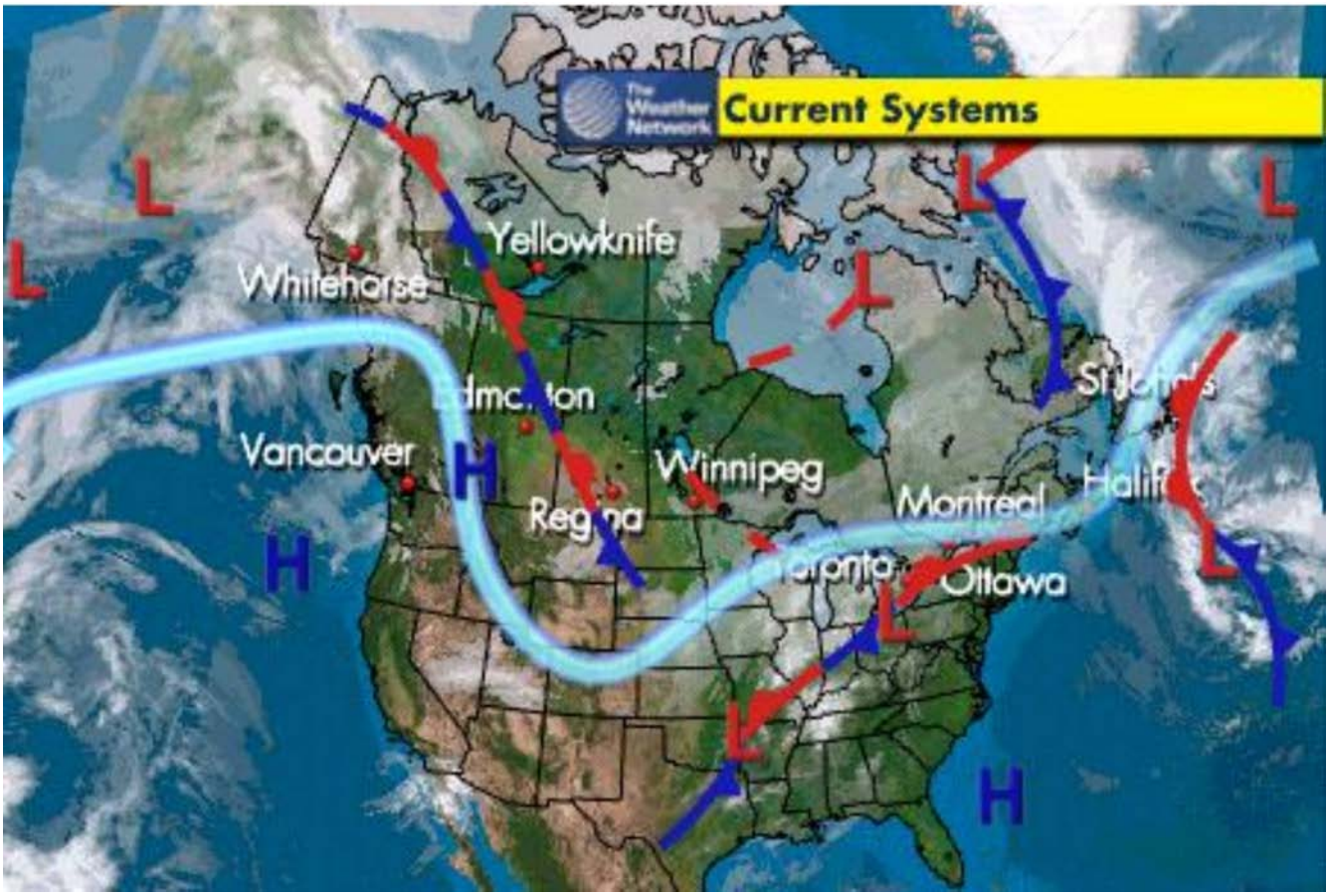
SAMPLE WEATHER SYSTEMS MAP



"Weather Maps", Systems, by theweathernetwork.com. Copyright 2007 by the Weather Network. Retrieved, November 21, 2007, from http://www.theweathernetwork.com/weather/maps/images/floods/currentfronts.rgb.jpg

Figure 1Y-1 Cloud Weather Signs

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CHAPTER 2
PO S292 – ASSIST WITH A FIELD EXERCISE

ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 1

EO S292.01 – ATTEND A FIELD SAFETY BRIEFING

Total Time: 40 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Review CSTC regulations for fire orders, evacuation procedures and other emergency protocol.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TP 1 to present basic material to the cadet.

Demonstration was chosen for TP 2 as it allows the instructor to demonstrate the actions to be taken in emergency situations.

INTRODUCTION

REVIEW

The review for this lesson will be of EO M190.03 (Observe Site Policies and Procedures, A-CR-CCP-801/PF-001, Chapter 15, Section 3).

OBJECTIVES

By the end of this lesson the cadet shall have attended a field safety briefing.

IMPORTANCE

It is important for the cadets to attend a field safety briefing on how to prevent accidents in the field and the actions to take in an emergency situation.

Teaching Point 1 **Identify Methods for Preventing Accidents**

Time: 10 min Method: Interactive Lecture

The reason for field safety briefings is to identify the possible incidents that could occur while cadets are in the field and the actions to take.

PREVENTING ACCIDENTS

Safety is of the utmost importance in the field. Running, engaging in horseplay or wandering off from the group is not acceptable behaviour during field training.

Other general safety concerns should be presented to the cadets at this point. These other concerns will be specific to the site where the activity is being conducted and will be contained in the operation order for the exercise.

Recognizing Fire Safety

Fire Procedures. All personnel need to be aware of what to do in case of a fire. If a cadet notices a fire they will shout “fire, fire, fire” and use a siren or whistle to sound an alarm. Upon hearing the alarm, all personnel will meet at the designated muster point. The cadet who noticed the fire will report to the senior officer on site.

Every cstc will have a fire rating system. Ensure the cadets understand what each rating means for the field.

Muster Point. The muster point is the area designated for all people at the site to gather in case of a fire or other emergency. It should be located away from hazardous areas and near the best route out of the bivouac.

Fire Fighting Equipment. The fire site location should contain basic fire fighting equipment such as fire extinguishers, fire brooms and buckets.

Identifying Boundaries

The boundaries of the bivouac site should be determined before the start of the exercise. Knowing where the boundaries are, decreases the chance of the cadets wandering away and becoming lost.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. What is a muster point?

Q2. What type of equipment should be in the fire site location?

Q3. What should be determined before the start of the exercise?

ANTICIPATED ANSWERS

A1. The muster point is the area designated for all people at the site to gather in case of a fire or other emergency.

A2. The fire site location should contain basic fire fighting equipment such as fire extinguishers, fire brooms and buckets.

A3. The boundaries of the bivouac site should be determined before the start of the exercise.

Teaching Point 2 **Demonstrate Actions to be Taken During Emergency Situations**

Time: 25 min Method: Demonstration

MEDICAL

In case of a medical emergency, the cadets need to be aware of actions to be taken. The cadets need to know where the first aid area is located, where to get medications, what to do if they come across a medical emergency, the muster point in case an evacuation needs to take place and who is in charge of, or trained in, first aid.

FIRE

In case of a fire, the cadets need to be aware of the actions to be taken.

Every CSTC will have different procedures in case of a fire. Ensure the cadets follow the regulations for their specific CSTC.

When in the field, brief the cadets on the fire safety rules and regulations.

ENCOUNTERS WITH INSECTS

Biting and stinging insects are found everywhere in the wilderness. They are the most common hazard for the nature enthusiast. About 15 percent of people will react seriously to bee and wasp stings and insect bites. For them, an insect can produce a condition known as anaphylactic shock, where tissues swell extensively and can constrict the airway. Reactions can start with headaches, fever and muscle spasms and can develop into widespread hives, nausea, dizziness and difficult breathing.

Common insects, such as mosquitoes and ticks, carry many serious diseases such as West Nile Virus, typhoid fever, dysentery, malaria and yellow fever. It is important to recognize the potentially dangerous insects, know which precautions to take, and know the immediate actions to take if stung.

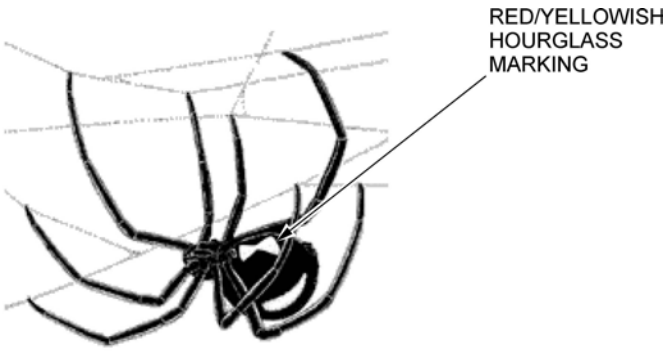
Spiders

Though most spiders are venomous and considered predators, few are actually considered a health threat. In fact, spiders are actually helpful in controlling other pests in the home or garden because they feed on other insects and spiders. They generally bite and inject venom into their prey and rarely bite humans. The venom of most species is not very toxic to humans, usually resulting in no more than a slight swelling, inflammation, or an itching sensation. In Canada, the two spiders that can be a health risk are the black widow and the brown recluse.

Black Widow Spider. Black widow spiders have a dark brown to glossy black body. However, the young black widows are white in colour. The female is extremely poisonous. She has a red or yellow hourglass marking on the underside of the abdomen (as per Figure 2-1-1). The male does not have this marking and is smaller.

Black widows are usually found outdoors in sheds, outhouses, under stones, logs, in hollow stumps and sometimes indoors in dark corners of garages, rock walls, barns or woodpiles. Their web is distinctive. The strands of silk run in many directions so the web appears as a concentration of irregularly arranged threads.

The silk strand of the web is considerably heavier and stronger than those of other species that form similarly shaped webs.



J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 464)

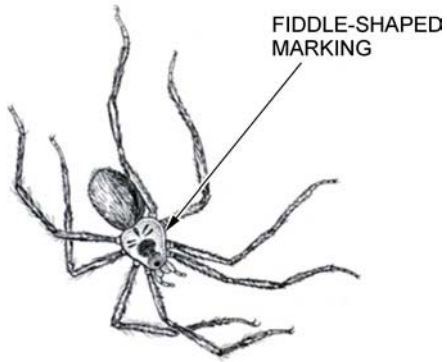
Figure 2-1-1 Female Black Widow

The female black widow will bite when handled or accidentally touched. Their bites produce local redness with two tiny red spots, severe pain, sweating, shivering, nausea and weakness. The victim could even writhe in agony and have difficulty talking and breathing. It is rarely fatal, but can disable the victim for up to a week. The venom's effect will occur in about 30 minutes and attacks the nervous system. Serum is needed to counteract the black widow's venom.

When travelling to a doctor, keep the victim calm and apply an antiseptic to the sting area. Place an ice pack around the bite area to slow the spread of the venom.

Wearing leather gloves when working around potential black widow habitats will help avoid getting bitten.

Brown Recluse Spider. The brown recluse spider has a light yellow to dark brown body, with an oval shape. It also has a distinctive fiddle-shaped mark on its back. These spiders make an irregular and sticky web that is used for shelter rather than for trapping insects.



J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 464)

Figure 2-1-2 Brown Recluse Spider

Though active throughout the year, they often go unnoticed because of their reclusive habits. Brown recluse spiders may be found in dark, secluded indoor places that are dry, cluttered, undisturbed and contain a supply of insects for food. They are most commonly found behind baseboards, under tables and chairs, in the basement, crawlspace, attic, infesting cedar shake roofs and in garages and sheds.

Their bites are poisonous and mostly occur when the spider is trapped in shoes or clothing, rolled on while in bed, or encountered when cleaning storage areas. The brown recluse spider's venom attacks the cells of flesh

and produces necrosis or dead tissue in humans. Though fatalities are rare, if quick medical action is not taken, weak adults or children have been known to die.

The bite is not usually felt, but a stinging sensation may develop shortly after, followed by intense pain. The reaction may not occur until an hour or more after the bite. The bitten area will first develop a small, white blister and enlarge as the venom attacks and kills the tissue in the affected area. Eventually, the affected tissue will die and leave a sunken, ulcerated sore. Other reactions include fever, chills, vomiting, joint pain, spotty skin, blisters, swelling, rash, nausea, jaundice and cramps.

The healing process is slow, generally six to eight weeks. Though no anti-venom is available, prompt medical treatment can prevent severe reaction and minimize the extent of damaged tissue and eventual scarring, disfigurement or amputation.

To avoid getting bitten by the brown recluse, shake out unworn or stored shoes and clothes before wearing. Check bed linens of unoccupied beds and wear leather gloves when working around potential habitats.

Bees and Wasps

Bees. Bees are a venomous, stinging, social insect that are abundant in urban areas. When their nests are disturbed, bees will get defensive and can inflict multiple stings.

Honeybees are less aggressive, as they live in well-protected hollow trees and other cavities. They do not have to protect their nests, so they do not have to be aggressive or sting as frequently to protect their home. This type of bee stings only once, as the barbed stinger will stay embedded in the skin. The stinger embedded in the skin must be removed as soon as possible as the venom sac will continue to pump for two to three minutes driving the venom deeper into the skin. The best way to remove the stinger is to scrape it out with a fingernail, as this will avoid squeezing the venom sac.

Wasps. There are several varieties of wasps in North America, including the yellow jacket, hornet and paper wasp. Colour ranges from black to combinations of black with yellow, white or brown markings. The slim winged body measures 10 to 19 mm. All wasp species have chewing mouthparts and only the females possess a stinger.

J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 465)

Figure 2-1-3 Wasp

Nests can be found around buildings, on verandas, under eaves, ceilings, attics or in trees and shrubs. Several varieties of wasp build nests underground. Wasps are very protective of their nest and, though they will use the nest for only one season, it can contain as many as 10 000 to 30 000 wasps.

Like bees, wasps inject venom under the skin. Wasps have smoother stingers than bees; therefore they can sting numerous times. Their sting produces a few minutes of fierce burning, followed by redness and itching at the point of the sting. A welt may form and subside in three or four hours. A wasp sting, aside from being very painful, can be serious and sometimes fatal.

If a wasp stings someone, the sting area must be washed with soap and water. If the stinger and venom sac remain in the wound, a fingernail or knife blade can be used to scrape them out. The sting area should be washed again.

Mosquitoes and Ticks

Mosquitoes. Mosquitoes carry a lot of diseases with them. Mosquito bites may cause reactions, like swelling, and make people sick. Swelling and fever may result from multiple bites.

Recent studies on mosquitoes show the following:

- Mosquitoes seem to be attracted to taller people and people who are fidgety, as they exhale more carbon dioxide, which attracts mosquitoes.
- Mosquitoes are attracted to wet clothing and even more to clothing with perspiration. They also prefer the colour blue.
- Mosquitoes can detect humans from as far away as 6 m (18 ft). They are attracted to heat, moisture and carbon dioxide. All of these factors are increased when moving a lot on a warm day.

Upon biting, the mosquito injects saliva into the body to help extract the blood. The saliva causes itching.

Ticks. Ticks can cause irritation and, in some cases, carry germs. They are flat-bodied and round, with a small biting head that embeds into the skin.

J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 465)

Figure 2-1-4 Tick

Hikers and walkers must check their legs and hair daily for ticks embedded in the skin. If one is found, the following should be done:

1. Put heat, oil, petroleum jelly, alcohol, nail polish or hot water on the back of the tick. This will prevent the tick from breathing and it will release its hold immediately.
2. If the tick does not come off, leave the oil on for half an hour and use a pair of tweezers to remove it by pinching as close to the skin as possible and pulling gently. Do not use fingers to pull the tick out.
3. Wash the area with soap and water.

DANGEROUS ANIMALS

Large Animals

If there are known dangerous animals near the CSTC focus on those animals.

The word “attack” is referred to numerous times throughout this TP. Ensure the cadets are aware that an attack is a form of violence and does not always indicate injury or harm.

Though attacks are uncommon, stress the importance of knowing what to do if the situation ever arises.

Bears. Bear attacks are uncommon. Wild animals generally prefer to avoid human contact and bears are no exception. The best way to live safely with bears is to avoid contact with them. Preventative actions include:

- making noise;
- hiking in groups and mainly in the daylight;
- staying on established trails;
- using extra caution when travelling near rushing water or into the wind;
- staying in open areas as much as possible; and
- disposing of garbage frequently, in designated areas.

When hiking/training in an area that has bears, always have bear spray or pepper spray on hand.

If you carry bear spray, be aware that wind, spray distance, rain, freezing temperatures, and product shelf life can all influence its effectiveness.

Demonstrate walking through the field making noises.

There are two kinds of attacks, based on the bear’s behaviour—defensive and predatory.

Defensive Attack. This attack normally occurs when the bear is feeding, protecting its young and/or unaware of a person's presence. It attacks mainly because it sees the person as a threat. It is the most common type of attack.

Predatory Attack. This attack normally occurs when the bear is stalking a person along a trail and then attacks. It may also happen at night.

When a black bear attacks:

- Do not play dead.
- Fight back—hit its snout, try to poke a stick in its eye, throw dirt or rocks into its eyes, do anything to distract attention.
- Do not climb a tree or run. Black bears can climb trees very fast.

When a grizzly bear attacks:

- Play dead by lying flat on the stomach with the legs spread out, cover the neck with intertwined fingers, and have elbows covering the face. Spreading the legs out will help prevent the bear from rolling you over.
- Do not attempt to run, as the bear can outrun you and the action of running will trigger the bear's predatory instinct.
- If the bear rolls you over, keep rolling to land on your stomach. At this point the bear may get bored and leave. Do not move until it is clear that the bear has left. It may only be lying nearby and resting.
- If the bear starts to lick your wounds, the attack has turned very serious and fighting back is necessary. Try hitting it on its snout or poking a stick or finger in its eyes.

There are bear-specific characteristics to note.

Black Bears. Black bears have been known to be on the lookout for "easy" calories. Once they find human food or garbage (if they are food-conditioned), they continue to seek it out from backpacks, picnic tables, tents, coolers, etc. When accustomed to humans, their natural fear fades and they take more chances to find food.

Grizzly Bears. The most common circumstance of attack is the "sudden encounter." To decrease chances of coming into a conflict, regularly make noise when hiking.

Wolves

Most people will never see a wolf; they are shy and generally avoid humans. Wolves can, however, lose their fear of humans and may approach camping areas or homes.

Attacks by healthy wild wolves do occur but are rare. The majority of attacks have been from rabid wolves.

Preventative actions include:

- Never feed wolves or any other wildlife.
- Dispose of all garbage.
- Ignore a wolf as much as possible if it comes into sight.
- Never allow a wolf to get close.
- Never approach a wolf.

If a wolf acts aggressively (growls or snarls) or fearlessly, actions that should be taken include:

- raising and waving arms to appear larger;
- backing away slowly;
- making noise; and
- throwing objects.

Demonstrate raising and waving arms.

Demonstrate backing away slowly, making noise and throwing objects.

Coyotes

Unlike wolves, coyotes do not have a natural fear of human beings. In highly populated areas, they are often seen patrolling, looking for garbage or small animals. Coyotes that are being fed will often bite, sometimes seriously.

Preventative actions include:

- Never feed coyotes or any other wildlife.
- Dispose of all garbage.
- Supervise children closely.
- Keep pets inside at night.
- Never approach a coyote.

If a person encounters a coyote, actions that should be taken include:

- stopping immediately and remaining calm;
- raising and waving arms to appear larger;
- backing away slowly if the coyote is not looking in their direction; and
- throwing stones or other objects.

Never turn away from a coyote or run since this will encourage a coyote to chase. If a coyote attacks, fight back.

Demonstrate raising and waving arms.

Demonstrate backing away slowly and throwing objects.

Cougars

Cougar attacks are unlikely among humans, partially because cougars do not perceive humans as prey. Cougar populations are growing throughout western Canada. Females with kittens and those that are cornered,

surprised or feeding on a kill may act aggressively. Cougars often show curiosity toward human activities without behaving aggressively.

Cougars may display various behaviours as a warning before an attack, such as stalking, crouching, sweeping their tail, extending their eye contact, snarling, keeping their body low to the ground, and pumping their rear legs.

Some preventative actions include:

- Do not hike alone.
- If confronted, stay calm and do not run; it may stimulate the instinct to chase.
- Maintain eye contact and shout as calmly as possible.
- Try to appear larger by raising and waving arms.
- Arm yourself with a stick.
- Never turn your back.
- Do not “play dead.”
- Throw rocks.

Demonstrate raising and waving arms.

Demonstrate shouting calmly and throwing objects.

If a cougar attacks, fight back aggressively using any object nearby such as sticks or rocks.

GENERAL EVACUATIONS

In many cases cadets will have to be sent to a medical facility or back to the CSTC for a variety of reasons. In these cases a staff member will either take the cadet back to the CSTC or they will wait with the cadet until help arrives.

Follow CSTC procedures for general evacuations.

ACTIVITY

Time: 15 min

OBJECTIVE

The objective of this activity is to have the cadets practice mustering at the gathering point for both a medical and a fire emergency.

RESOURCES

Whistle.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

1. Give the signal for a fire or medical emergency.
2. Have the cadets muster at the gathering point.
3. Have the cadets explain why they gathered at the point and why it is important.
4. Have the cadets practice both types of emergencies.

SAFETY

Have the cadets stay within the boundaries of the bivouac site. Ensure the cadets move in a safe manner to the gathering point.

CONFIRMATION OF TEACHING POINT 2

The cadets' participation in the activity TP 2 will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in attending a field safety briefing will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

It is important for the cadets to attend a field safety briefing on how to prevent accidents in the field and the actions to take in an emergency situation.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

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ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 2

EO S292.02 – PACK CLOTHING AND EQUIPMENT FOR A FIELD EXERCISE

Total Time:	80 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Several assistants will be required for TP 3, when the cadets wear their packed rucksack/backpack and make adjustments, due to the potential for injury.

The sample kit list of items is located at Annex A and may have to be adjusted IAW CSTC issued kit.

PRE-LESSON ASSIGNMENT

The cadets must be given a kit list of the items required for the lesson. The kit list should be issued to the cadets allowing them enough time to gather it all together and bring it to the lesson. The cadets should use their rucksack/backpack and laundry bag to move their items.

Photocopy and distribute kit list located at Annex A to each cadet prior to the lesson.

APPROACH

An interactive lecture was chosen for TP 1 as it allows the instructor to review basic material and allows the cadets to participate by asking or responding to questions and commenting on the material.

Demonstration and performance was chosen for TPs 2 and 3 as it allows the instructor to explain and demonstrate packing clothing and equipment for a field exercise while providing an opportunity for the cadet to practice this skill under supervision.

INTRODUCTION

REVIEW

The review for this lesson is of EO M190.01 (Pack Personal Equipment for a Field Exercise, A-CR-CCP-801/PF-001, Chapter 15, Section 1).

OBJECTIVES

By the end of this lesson the cadet shall have packed personal clothing and equipment and adjusted the load of their rucksack/backpack for a field exercise.

IMPORTANCE

It is important for the cadets to know how to properly pack and adjust the load of their personal kit as they will be using this knowledge for all future field exercises. A properly packed and adjusted rucksack/backpack reduces the chance of injury when it is being carried.

Teaching Point 1 **Review Selecting Clothing for a Field Exercise**

Time: 10 min Method: Interactive Lecture

WEATHER REQUIREMENTS

Clothing should be chosen with a consideration for weather conditions, both current and potential. Weather conditions are the largest factor in determining the potential of hypothermia, which is caused by the lowering of the body's temperature, through exposure (the physical condition resulting from being exposed to the elements). Clothing includes such items as:

- raingear,
- windbreaker,
- hat, and
- parka.

THE LAYERING PRINCIPLE

Keeping warm and dry is very important for personal comfort and in preventing hypothermia when outdoors. Wearing three loose fitting layers will allow a person to regulate their body temperature through the addition or removal of a layer. The purpose of three layers of clothing:

- the core layer pulls moisture from the body to keep dry;
- the second layer is the insulating layer; and
- the outer layer protects the body from wind and precipitation.

ADVANTAGES AND DISADVANTAGES OF FABRICS

Wool

Wool has insulating properties even when wet, but it becomes heavy and takes a long time to dry.

Cotton

Cotton is durable, breathable and absorbs moisture. When cotton becomes wet it can be heavy and it can shrink if it is dried at high temperatures. Also, it is not windproof.

Fleece or Pile

When used as an outer layer, fleece forces moisture away from the body while keeping it warm. Fleece, however, is not windproof and does not compress easily.

Synthetic Fabrics

Synthetic fabrics allow sweat to evaporate while keeping rain and other moisture away from the body. They are usually windproof and are an excellent choice for an outer layer. However, in very wet conditions, the fabric pores may become clogged and does not allow the fabric to breathe.

FOOTWEAR

Feet should be kept warm and dry. Due to the usually rough terrain encountered during field exercises, proper footwear is very important in reducing the risk of injuries. In general, runners are not designed to be used on rough terrain, unless they support the ankles. Hiking boots are preferred, with winter boots for the winter. Socks should be appropriate for the weather, including wearing two pairs in the winter. Socks should be changed daily. Socks that are dirty lose their insulating qualities.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. The weather should be considered when choosing clothing in order to reduce the potential of what?

Q2. Briefly describe the three layers of clothing and their purpose.

Q3. Why are most types of runners not appropriate for field training?

ANTICIPATED ANSWERS

A1. Hypothermia.

A2. The purpose of three layers of clothing includes:

- the core layer pulls moisture from the body to keep dry;
- the second layer is the insulating layer; and
- the outer layer protects the body from wind and precipitation.

A3. Field training usually occurs on rough terrain and most runners do not support the ankles.

Teaching Point 2 — **Demonstrate and Have the Cadets Pack Clothing and Equipment for a Field Exercise**

Time: 45 min — Method: Demonstration and Performance

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets pack their personal clothing and equipment.

RESOURCES

- Kit list located at Annex A,
- Issued clothing,
- Issued equipment,
- Personal clothing,
- Hygiene kit,
- Garbage bags, and

- Re-sealable plastic bags.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

This is a step-by-step process to load items based on weight and frequency of use. Placing items that are heavier close to the cadet's back to balance the load and make it easier to carry. Placing items that are used often near the top allows the cadet to access them without having to unpack everything and then repack it.

1. Demonstrate the packing of a rucksack/backpack, one category/step at a time, with the cadets performing the skill immediately.
2. Have the cadets line their rucksack/backpack with a garbage bag.
3. Have the cadets place items that are heavier high (near the top) in the pack and close to the back of the pack (the part that lies against the frame). This includes duplicates of items such as pants and shirts which are not needed immediately. Also pack the hygiene kit items.
4. Have the cadets place items that are light and used often on the top and near the front of the pack. This includes clothing required for layering such as a windbreaker and raingear.
5. Have the cadets place their personal items in separate re-sealable plastic bags with the air removed to conserve space. This includes items of clothing such as socks, underwear and items that can be damaged by water (eg, soap, sanitary napkins).
6. Have the cadets place the folded groundsheet at the top of the pack.
7. Have the cadets attach the sleeping bag (packed in the valise, rolled or stuffed, depending on type) and the rolled sleeping pad, firmly to the bottom of the pack.

Items issued, but not mentioned above, should be demonstrated at the appropriate step, based on the item's weight and how often it is used (eg, wash basin packed with sleeping bag, heavy boots high in the pack and close to the back of the pack).

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 2

The cadets' participation in packing their personal clothing and equipment will serve as confirmation of this TP.

Teaching Point 3 **Demonstrate and Have the Cadets Make Adjustments to the Rucksack/Backpack**

Time: 15 min Method: Demonstration and Performance

OBJECTIVE

The objective of this activity is to have the cadets make adjustments to their rucksack/backpack.

RESOURCES

Packed rucksack/backpack (from TP 2).

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

1. Divide the cadets into four groups, with one supervisor per group.
2. Demonstrate by putting on the rucksack/backpack, checking for balance, adjusting the straps and checking for weight (Can the cadet comfortably carry it?).
3. Have the cadet put on their rucksack/backpack.
4. Ask the cadet how it feels for balance, straps and weight.
5. If balanced improperly, have the cadet take off rucksack/backpack and adjust the interior load to shift the weight as required.
6. If overweight, have the cadet remove items.
7. Have the cadet adjust the straps to restrict movement of the load, but not restricting the cadet's circulation.

Excerpt from: CATO 14-37 *Rucksack Weight*, Paragraphs 6–8.

LOAD THAT A CADET CAN CARRY

- Cadets between the ages of 12 and 15 can carry a load not exceeding 25 percent of their body weight.
- Cadets 16 years of age and over can carry a load not exceeding 30 percent of their body weight.
- As cadet supervisors, we must consider other factors to prevent injuries. The medical condition and physical fitness of the cadet, the type of backpack, the distance covered and the type of terrain are all factors to consider. If one of those factors can affect the health/safety of the cadet, we must lighten the load that the cadet will carry. We must not wait until the cadet feels pain in the back, legs, knees, ankles or feet before taking action.

SAFETY

Care should be taken as the cadets lift, manoeuvre and adjust their rucksack/backpack.

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in this activity will serve as confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in packing and adjusting their rucksack/backpack will serve as confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

Choosing appropriate clothing will enhance the cadets' ability to enjoy the outdoors while minimizing the risk of hypothermia. The ability to properly pack and adjust personal clothing and equipment will allow the cadet to better enjoy field exercises with a reduced chance of injury.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

A3-047 D Cdts 3. (2003). CATO 14-37 *Rucksack Weight*. Ottawa, ON: Department of National Defence.

C3-021 (ISBN 0-7715-9035-0) McManners, H. (1994). *The Complete Wilderness Survival Manual*. McMillan Canada.

C3-024 (ISBN 0-7627-0476-4) Roberts, H. (1989). *Basic Essentials Backpacking*. Guildford, CT: The Globe Pequot Press.

C3-150 (ISBN 978-0-8117-3292-5) Davenport, G. (2002). *Wilderness Survival*. Mechanicsburg, PA: Stackpole Books.

ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 3

EO S292.03 – ASSIST WITH THE SET-UP OF AN EXERCISE SITE

Total Time:	80 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Photocopy the handout located at Annex B for each cadet.

Prepare and lay out the resources for TP 2.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TP 1 to introduce the cadet to the components of an exercise site.

Demonstration and performance was chosen for TP 2 as it allows the instructor to explain and demonstrate the set-up of the exercise site while providing an opportunity for the cadet to practice assisting with the set-up under supervision.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have assisted with the set-up of an exercise site.

IMPORTANCE

It is important for the cadets to know how to assist with the set-up of an exercise site so that they may help the senior cadets and adult staff during a field exercise. The more opportunities a cadet has to assist with the set-up of an exercise site the better prepared they will be when it is their turn to lead.

Teaching Point 1 **Identify Locations for Components**

Time: 15 min Method: Interactive Lecture

COMPONENTS OF AN EXERCISE SITE

Command Point

The command point is a meeting area for the group. Senior staff can usually be found at the command point. During a field exercise, the cadets should be able to identify the command point with ease. The command point should be a central location that is accessible by vehicles and that also acts as the communication centre.

Tent Line

The tent line is the area where both the male and female tents are situated. Tents are divided into two groups, one for males and one for females. All tents should be erected at least 3 m (10 ft) apart with the doors opposite to the prevailing winds. It is important that each tent is clearly marked and that the tents of all persons in charge are identified.

POL Site

The POL site is a clearly marked storing and filling station for petroleum, oil and lubricants (POL). A drip pan must be provided for spills and a spill kit should be available and accessible. The POL site should be kept towards the outside of the exercise site. Access to the POL site should be limited to those cadets and staff who have duties there.

Fire Point

The fire point is a centrally located, accessible point for housing the fire fighting equipment.

Fire Site

The fire site is a safe, vegetation free area to be used by the group to build and use fires. The fire site should be away from the sleeping area, preventing incidents related to sparks/fire.

Cooking Area

The cooking area is a central point for all foods to be consumed. The area assists in the control of waste and garbage. Garbage should be removed from the field site every night, if possible, or sealed to prevent attracting animals.

First Aid Site

The first aid site is the central point containing the first aid kits, stretchers and other first aid equipment. The first aid site should be centrally located within the exercise site. Every cadet should know where the first aid site is located.

Garbage Site

The garbage site is the central point for collection and storage of garbage. The garbage site should be at least 50 m (150 ft) from the cooking area and away from the rest of the exercise site. Having a garbage site will help ensure that the site is being kept clean. It should consist of garbage bags that are securely tied.

Wash Site

The wash site is the established area for washing/ablutions. The water used for cleaning and washing (grey water) should be disposed of away from the exercise site. Grey water must never be dumped on vegetation or in a natural water source. The wash site should be away from the drinking water, shelters and cooking area.

Tool Rack

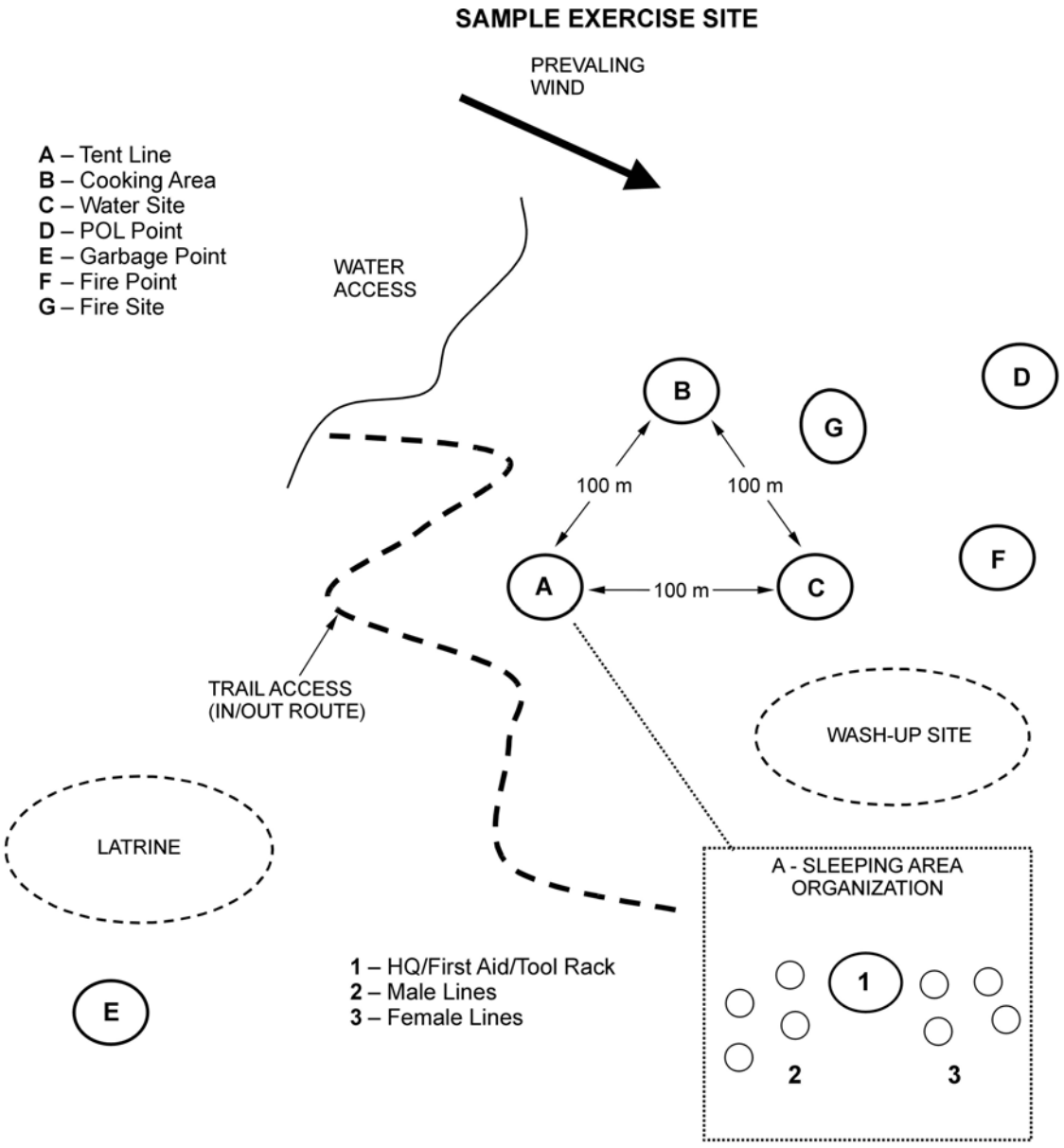
The tool rack is the location for storing tools. All equipment should be stored properly and protected from the elements in a modular tent or protective cover that is large enough to accommodate all the supplies. The tool rack should be in a central location and easily accessible. It is supervised by a staff cadet/officer who is responsible for the supplies.

Latrine

The latrine is the location of the portable toilets. The latrine should be downwind and at least 100 m (300 ft) away from the exercise site. There should be a clear path to and from the latrine, clearly marked so that it can be found at night.

Hand dug latrines are no longer used due to environmental impact. The cadets may learn how to dig latrines but they will not use them.

Once the listed components of the exercise site have been discussed, the cadets will tour the site with the instructor. Describe the layout of each component, and explain why it is located at that location.



D Cdts 3, 2007, Ottawa, ON: Department of National Defence

Figure 2-3-1 Exercise Site

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. What is the tent line?

Q2. What is the fire site?

Q3. What is the POL site?

ANTICIPATED ANSWERS

A1. The area the tents are located.

A2. The fire site is a safe, vegetation free area to be used by the group to build and use fires.

A3. The POL site is a clearly marked storing and filling station for petroleum, oil and lubricants (POL).

Teaching Point 2 **Demonstrate and Have the Cadet Assist With the Set-Up of the Exercise Site**

Time: 60 min Method: Demonstration and Performance

Describe the layout of each component and show the cadets how to set up one of the components.

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets assist with the set-up of the exercise site.

RESOURCES

- Flagging tape,
- Cord,
- Tools,
- Firefighting equipment,
- First aid equipment,
- Modular tents,
- 5- or 10-person arctic tents,
- Civilian-pattern dome tents,
- Ground sheets,
- Two-burner naphtha stove,
- Dual-generator naphtha lantern,
- Petroleum, oil and lubricants (POL),
- Tables/Benches,
- Jerry cans, and
- Cook sets.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

1. Distribute Annex B to the cadets.
2. Give the cadets the resources.
3. Have the cadets choose which component they would like to set up.
4. Have the cadets set up the exercise site.
5. Supervise and give feedback on the set-up of the exercise site.
6. Have the cadets explain why they chose the specific area for the placement of their component.
7. Have the cadets tear down the exercise site and return the resources.

SAFETY

Ensure the cadets use extreme caution when moving the resources.

CONFIRMATION OF TEACHING POINT 2

The cadets' participation in the activity in TP 2 will serve as the confirmation of this lesson.

END OF LESSON CONFIRMATION

The cadets' participation in the set-up of the exercise site will serve as the confirmation of this TP.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

It is important for the cadets to know how to assist with the set-up of an exercise site so that they may help the senior cadets during a field exercise. The more opportunities a cadet has to assist with a set-up of an exercise site the better prepared they will be when it is their turn to lead.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

C3-003 (SBN 1-896713-00-9) Tawrell, P. (1996). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Paul Tawrell.

ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 4

EO S292.04 – ERECT, TEAR DOWN AD PACK TENTS

Total Time:	120 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Additional instructors are required for this lesson to ensure TP1 is covered in the time allotted.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

Demonstration and performance was chosen for TP 1 as it allows the instructor to explain and demonstrate erecting, tearing down and packing a Modular tent while providing an opportunity for the cadets to practice these skills under supervision.

A demonstration was chosen for TPs 2–3 as it allows the instructor to demonstrate erecting, tearing down and packing a variety of tents while providing the cadets with knowledge on the subject matter.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have the opportunity to erect, tear down and pack a two-section Modular tent with walls.

IMPORTANCE

It is important for the cadets to be able to use a Modular tent because they are often used during survival exercises. A cadets' understanding of this lesson will allow them to better assist in the set-up of a survival exercise.

Teaching Point 1 **Explain, Demonstrate and Have the Cadets, as a Member of a Group, Erect, Tear Down and Pack a Two-Section Modular Tent With Walls**

Time: 60 min Method: Demonstration and Performance

For this skill lesson, it is recommended that the instruction take the following format:

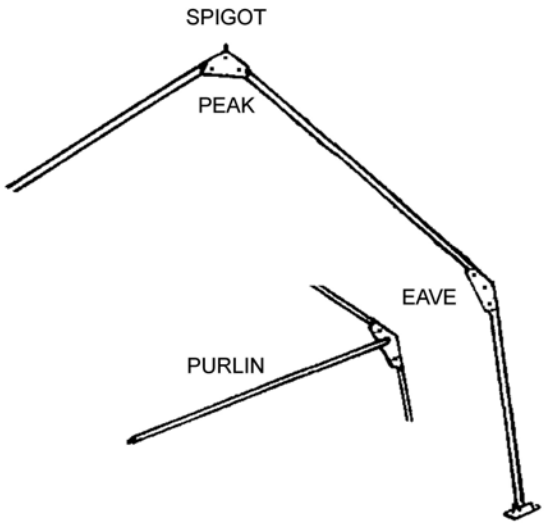
1. Divide the flight into two groups.
2. Explain and demonstrate each step in erecting, tearing down and packing a Modular tent.
3. After demonstrating each step have the cadets perform the skill while monitoring their performance.

Note: Two instructors are required for this TP.

If the Modular tent is going to remain erected for the duration of the course/exercise instruct tearing down and packing at the end of the course/exercise.

COMPONENTS OF A MODULAR TENT

A module of tent is comprised of a canvas section supported by tubular aluminum framework. It measures 2.5 m long by 5.5 m wide. The frame of a Modular tent consists of two arch frames and three purlins (the horizontal beams along the length of the roof that support the canvas). The arch frame is hinged at the peak and the eaves. When folded the arch measures 2.75 m long. The purlins are 2.5 m long and connect two arches; one purlin at the peak and two more at each eave. They are locked into place without the use of tools. The framework is anchored with steel pegs which are inserted at the base of each arch and can be diagonally cross braced with cables or straps, between the eaves and base of the arches, to give an unobstructed inside space and an outside perimeter clear of guy wires. Guy wires are only used when the tent requires further reinforcement.



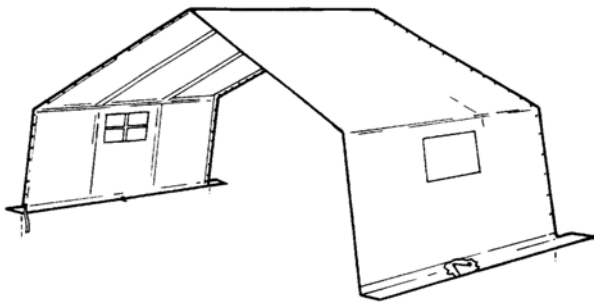
D Cdts 3, 2007, Ottawa, ON: Department of National Defence

Figure 2-4-1 Frame

TENT SECTIONS

The three tent sections are: centre sections, front walls and rear walls. The tent sections attach to one another by means of a series of cord loops and grommets known as “Dutch lacing”. The cord loops are on the opposite side of the grommets requiring all sections to be placed in the same direction. For example, all the cord loops on the right. Tent sections are made of olive green, core-spun, polyester-cotton, rip-stop woven material treated to be water-, rot- and flame-resistant. The sod cloth which extends 40 cm from the foot of each tent section is made from plastic-coated, waterproof material. The windows are screened and have blackout flaps and transparent vinyl panels which are attached with fastener tape (Velcro).

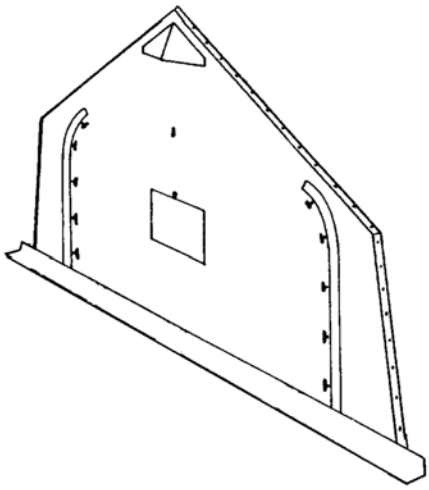
Centre Section. This is the canvas roof and side wall covering of a module. It has a window in each side and a chimney opening in the roof.



C-87-110-000/MS-000, Operational Support and Maintenance Manual for Tent, Main (p. 1-5)

Figure 2-4-2 Centre Section

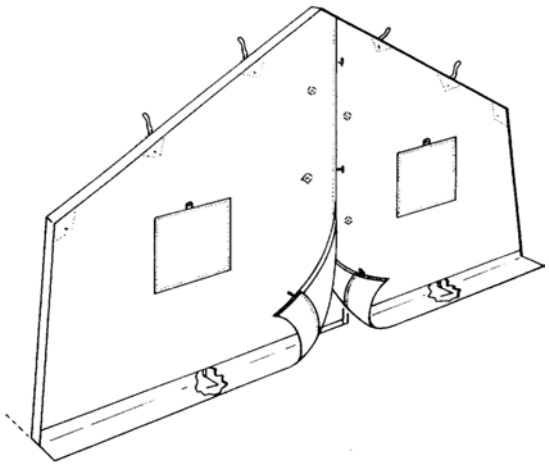
Front Wall. Attaches with grommets and opens with two zippered personnel doors. The front wall includes one window and a closable air vent.



C-87-110-000/MS-000 (p. 1-5)

Figure 2-4-3 Front Wall

Rear Wall. Attaches with cord loops and opens in the centre. The opening reaches the peak of the module and is fastened with toggles, allowing access for large equipment. The rear wall includes two windows.



C-87-110-000/MS-000 (p. 1-5)

Figure 2-4-4 Rear Wall

ACCESSORIES

Liners. The three common tent sections—centre section, front wall and rear wall—each have corresponding white fabric liners. These provide insulation as well as a light reflective surface, and are made from flame resistant material. The liners are suspended from inside the frame and are laced together similar to the tent sections.

Blackout Hallway. Black fabric enclosure, 2.5 m long, attached inside the tent and laced to a grommet by the doorway, to prevent the entranceway from emitting light.

Lacing Band. Provides the cord loops, to tie the two tent sections together when the module lacing sequence is disrupted because two grommet ends meet. It is 8.5 m long and 15 cm wide. A strap and a hooked shock cord are at each end to secure it to the frame and keep the band taut against the canvas.

Guy Wires. Lines of cord that assist in securing the tent to the ground. Available for situations where the footings cannot be anchored in the ground or where the tent is subject to extreme windy conditions.

Bag Tent. This is a flat canvas wrap specifically designed for containing tent sections. It includes a pocket to hold pertinent hardware.

Tools. A mallet, shovel and occasionally a stepladder. Tools are not included.

Explain tent maintenance and site selection to the cadets, but do not demonstrate or have the cadets perform.

TENT MAINTENANCE

The following precautionary measures, when followed, will protect the tent components from corrosion, mildew, rot and unnecessary damage and will work to prolong the life and usefulness of the tentage:

- Avoid folding or packing tent or liner sections when wet. Wet or damp tentage shall be unfolded and air dried within 48 hours.
- Protect tent and liner sections from petroleum and chemical stains. If soiling occurs, clean immediately with warm soapy water.
- Do not allow oil, mud or other foreign matter to gather or harden on frame components. Warm soapy water or cleaning solvents are recommended for cleaning. The components should not be lubricated.
- Do not leave collapsed tent sections and components in contact with the ground or exposed to the elements for more than 48 hours.
- All detected damage should be identified, reported and repaired at the earliest convenience.
- Dragging tentage on the ground, walking on tentage and general rough handling is prohibited.
- Effort shall be made to keep tentage equipment serviceable at all times and preventative maintenance practices must be employed during use.
- Erect and tear down tentage in accordance with the detailed procedures.

A site should be pre-determined when explaining these points. There is no requirement for the cadets to choose a site.

SITE SELECTION

The following considerations should be made when selecting a site for the Modular tent:

- Access for vehicles is required for easy set-up and equipment transport.
- Firm level ground, high enough for natural drainage, is preferred. It is desirable to have a tough grass turf, free from projecting tree roots and rocks.
- Positioning the tent to avoid prevailing winds bearing directly in line with an end wall.

- A shady area free of underbrush is desirable in a hot climate. Doors should be accessible and trees that rub against the canvas in the wind should be removed or avoided.
- Cooking shall be conducted 100 m from tents used for sleeping personnel.

When selecting a tent site on snow-covered ground, choose an area free from crevices. Prod the surface to ensure that a flat base is selected. The snow shall be removed until a firm base is exposed. The tent shall, if possible, be positioned so that its side is located downwind to avoid drifting snow blocking the entranceway.

Explain, demonstrate and have the cadets perform each step in erecting, tearing down and packing.

ERECTING

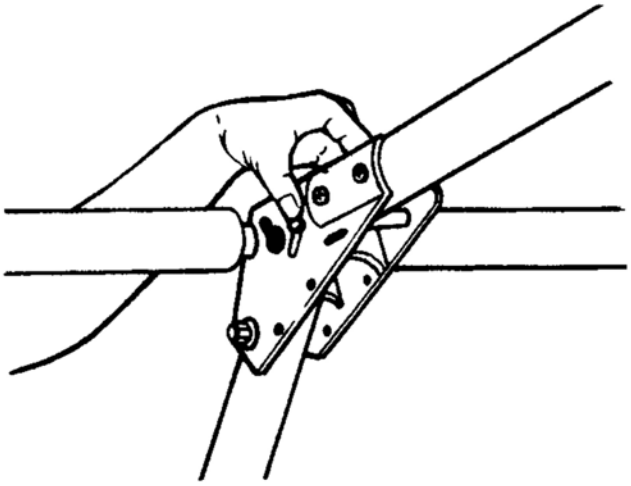
Lay Out and Connect Frame

Expand all arch frames leaving the legs in a folded position and space them in module increments using a purlin as a measure. Connect the purlins to each arch at the peak and eaves.

Frame Locks

To operate the connecting, locking device on the peak bracket, first ensure the lock is released, by:

1. placing the button head pin of the purlin into the bracket keyhole and push it upwards in the keyhole slot;
2. moving the sliding bar up to allow the pivot lock to be swung over to hold the purlin in place;
3. moving the sliding bar down to lock the pivot;
4. operating the save bracket lock by lifting the sliding bar; and
5. releasing the arch frame leg from its erected state and moving down the lever lock, located inside the eave bracket.



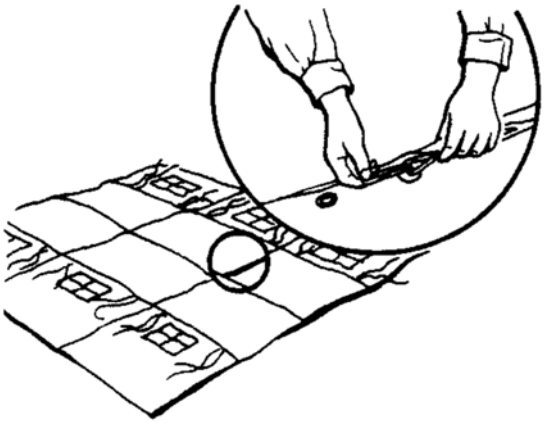
C-87-110-000/MS-000 (p. 2-5)

Figure 2-4-5 Frame Lock

Connect Tent Sections

Identify the tent sections and position them so the front-rear sequence of lacing corresponds to the front and rear wall location. Lace the centre sections together using the dutch lace as follows:

1. Sandwich the grommet side between the flaps on the lacing side.

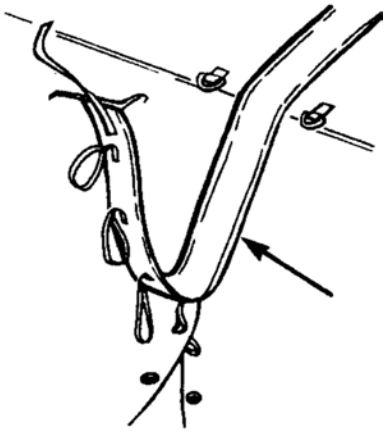


C-87-110-000/MS-000 (p. 2-8)

Figure 2-4-6 Canvas Lacing

2. Pass the cord loops through the corresponding grommet holes and then through the next loop working from the centre outwards.

3. Tie off the last loop.



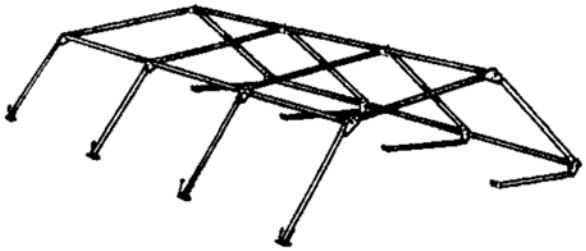
C-87-110-000/MS-000 (p. 1-8)

Figure 2-4-7 Canvas Lacing

Raise Side and Place Canvas

The following steps outline the procedure for raising the Modular tent structure and placing the canvas:

1. Ensure the doors on the front and rear walls are closed. If the doors are left open they will be difficult to close after the Modular tent is erected.
2. Raise one side of the frame with one person assigned to each arch frame. In windy conditions temporarily secure the upright section to the ground with the tent pegs.



C-87-110-000/MS-000 (p. 2-8)

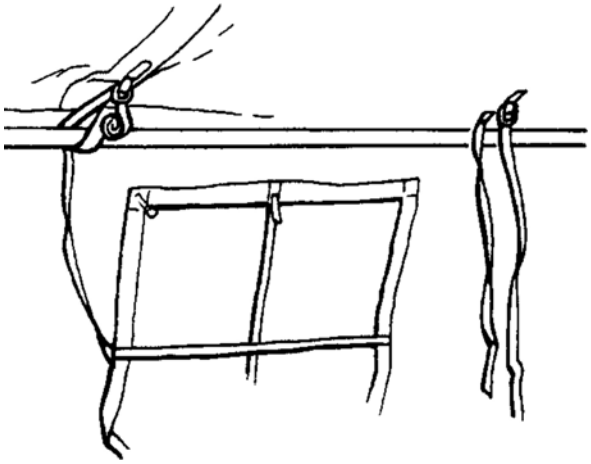
Figure 2-4-8 Erect One Side

3. Place the previously folded canvas on the sloped side of the frame, positioning the master grommets (large holes at the peak of the canvas) over the frame spigots (large point at the peak of the frame), and then unfold the canvas onto the raised side.

C-87-110-000/MS-000 (p. 2-8)

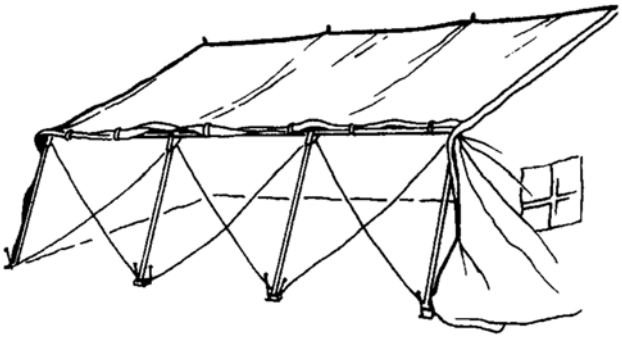
Figure 2-4-9 Place Canvas

4. Secure eave and foot straps on the raised side.
5. Attach the front and rear walls to the centre sections along the roof line only.
6. Raise the other side of the tent and align legs.
7. Attach save straps (straps on the underside of the canvas that attach to the purlins as illustrated in Figure 2-4-10) and bracing cables (support cables as illustrated in Figure 2-4-11) but do not tighten.



C-87-110-000/MS-000 (p. 2-8)

Figure 2-4-10 Save Straps



C-87-110-000/MS-000 (p. 2-8)

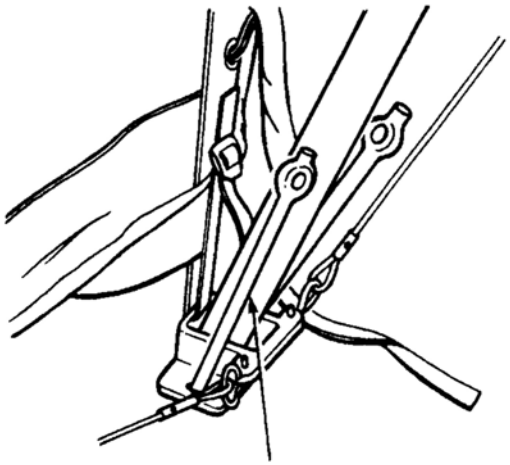
Figure 2-4-11 Bracing Cables

8. Complete lacing the end walls to the centre sections.
9. Raise the other side and adjust the positioning and alignment of the arch legs to achieve a smooth canvas fit.

Anchor

The following steps outline the procedure for anchoring the Modular tent to the ground:

1. Secure the frame to the ground. Hammer in the steel pegs (two per foot), working from the outside of the tent, so that the pegs are angled inwards (to prevent frame lifting as illustrated in Figure 2-4-12).



C-87-110-000/MS-000 (p. 2-8)

Figure 2-4-12 Drive in Pegs

2. Tighten bracing cables or bracing straps to maximum tension.
3. Attach the foot strap, cinching to the maximum.
4. When using bracing cables, connect the vertical hold anchors with the corresponding D rings at the anchor points along the ground line of the canvas.
5. Drive the pegs into the ground under the sod cloth so that the side wall canvas is taut.

6. Connect the sod cloth flaps with the toggles and loops at the corners and along the sides. Place sod, snow or other suitable material on the sod cloths to prevent the wind from getting underneath them.

A trench is sometimes required when the tent is pitched on poor draining ground such as a flat, clay or heavy soil surfaces or shallow soil over bed rock. Sandy soils or areas which slope off normally do not require drainage trenches. The trench should be 20 cm wide by 15 cm deep. Slope the trench so that it drains away from the tent. Dig outlet drains at the lowest points of the trench, ensuring that they do not interfere with pedestrian or vehicular movement.

Only dig a trench if the situation requires.

TEARING DOWN

The reverse order for erecting is used to tear down a Modular tent. The steps are:

1. Loosen cables and ground anchors and remove (if wind is not too strong), otherwise leave until the tent is lowered.
2. Remove material from the sod cloth.
3. Release all straps and lacing up to the eave purlins.
4. Lower the tent one side at a time.
5. Unlace tent walls and sections and remove from frame.
6. Dismantle frame (reverse procedure).

Ensure that arrangements are made to clean and dry the equipment, if required, at the earliest opportunity.

PACKING

Lay out the canvas with the outer surface facing the ground, for ease of cleaning. A diagram of the packing procedure is located at Annex C. There are different methods of folding Modular tent canvas. Check with the local supply for the preferred method.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in this activity will serve as the confirmation of this TP.

Teaching Point 2 **Explain and Demonstrate Erecting, Tearing Down and Packing a 5- or 10-person Arctic Tent**

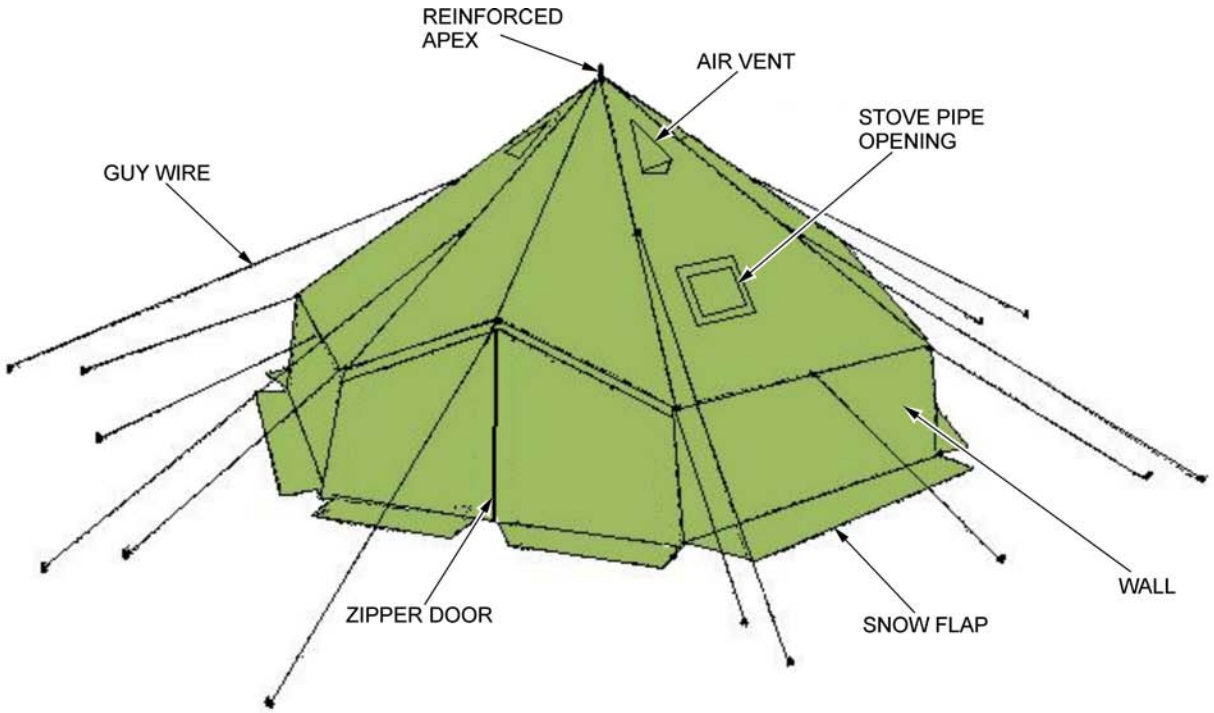
Time: 30 min Method: Demonstration

These descriptions and instructions will be given as the tent is being erected, torn down and packed.

If the Arctic tent is going to remain erected for the duration of the course/exercise instruct tearing down and packing at the end of the course/exercise.

COMPONENTS OF A 5- OR 10-PERSON ARCTIC TENT

The 5- and 10-person Arctic tents are bell-shaped with a pentagonal base. Each wall section of the pentagon has a snow flap attached to the bottom portion of its panel. The tent consists of an inner and an outer portion. The inner portion is most commonly used for cadet training and consists of a zipper door, base tie-down points, air vents, stove pipe openings and a reinforced apex for pole insertion. The tent is supported by a single telescopic centre pole and 16 (10-person) or 10 (5-person) guy wires. The guy wires are pegged down with lightweight alloy or plastic pegs.

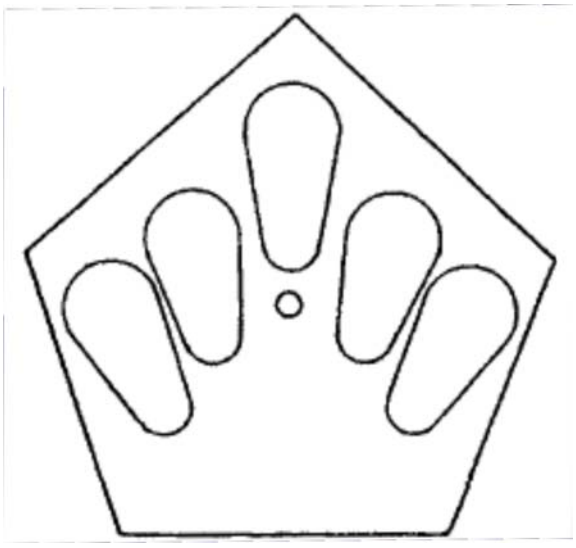


D Cdts 3, 2007, Ottawa, ON: Department of National Defence

Figure 2-4-13 10-Person Arctic Tent Parts

Hero Army Surplus, Army Tents, by heroarmysurplus.com, 2007. Copyright 2007 by heroarmysurplus.com. Retrieved December 2, 2007, from http://heroarmysurplus.com/index.php/cPath/116?osCsid=jncvpsk59lech7i4chhja975q6

Figure 2-4-14 5-Person Arctic Tent

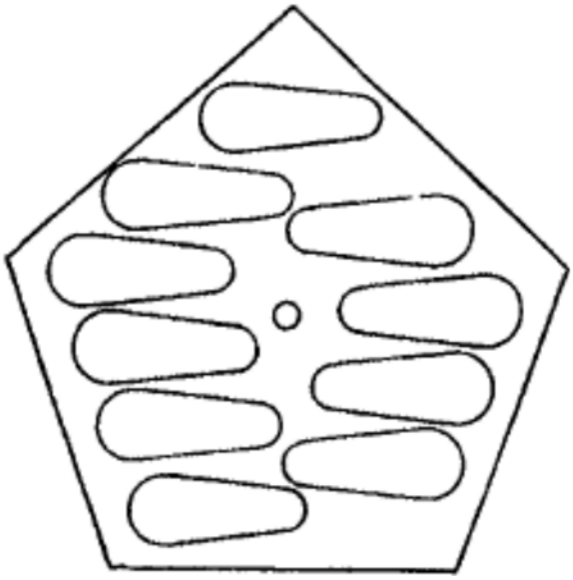


B-GG-302-002/FP-001 Arctic and Sub-Arctic Operations, Part 1 (p. 3-11)

Figure 2-4-15 5-Person Arctic Tent Sleeping Arrangement

Hero Army Surplus, Army Tents, by heroarmysurplus.com, 2007. Copyright 2007 by heroarmysurplus.com. Retrieved December 2, 2007, from http://heroarmysurplus.com/index.php/cPath/116?osCsid=jncvpsk59lech7i4chhja975q6

Figure 2-4-16 10-Person Arctic Tent



B-GG-302-002/FP-001 (p. 3-12)

Figure 2-4-17 10-Person Arctic Tent Sleeping Arrangement

ARCTIC TENT INSPECTION

The tent must be inspected to ensure the following faults are not present:

- Reinforced ring on apex damaged or torn.
- Air vents are stuck closed or damaged.

- Panels have tears, holes, broken threads or seams.
- Guy wires or loops are either damaged or missing.
- Broken or frayed guy wires or guy wire loops.
- Stove pipe opening is damaged or missing.
- Zipper on the outer door is broken.
- Snow flaps with eyelets are torn away from the walls.
- Drying line keepers are torn away from the seams.
- Toggles are missing.
- Telescopic pole (10-person tent) sections have bends or splits or the pole keeper pin is missing.
- Tent pole (5-person tent) has bends or splits and do not fit together properly.
- Base plate has cracks and, in the case of the 5-person tent, the base plate keep pin is missing.
- Pegs have broken points or bends.

ERECTING

Explain and demonstrate the following. The instructor can have cadets assist as necessary.

The only difference in erecting these two tents is the number of guy wires. On a 5-person Arctic tent there are 5 wires and on a 10-person Arctic tent there are 16. The following outlines the steps to take for erecting a 5- or 10-person Arctic tent:

1. Choose a site for the tent (see TP 1 Site Selection).
2. Spread the tent out on the ground with the outside facing up.
3. Ensure the zipper is closed on the front door.
4. Check if the liner is in place; usually it is not in place in a new tent.
5. If the liner is not in place, follow these steps:
    a. Spread out the liner above the tent with the inside of the tent facing up.
    b. Attach the top and bottom stove pipe toggles of the liner to the tent.
    c. Attach the remaining toggles of the liner to the tent. Use the corners of the tent as check points to make sure a toggle was not missed.
    d. Thread the lower drying line through the drying line keepers.
6. Peg the corners of the Arctic tent.
7. The tent pole will be folded in two. Straighten and lock it into position.

8. The individual (pole person) takes the pole and base plate under the canvas, going through the door and inserting it into the centre eye (reinforced apex) of the tent.
9. Secure the base of the pole onto the base plate and have the pole person hold the pole upright.
10. Before erecting the pole, drive the corner pegs into the ground.
11. Have the pole person extend the pole until the skirt and snow flaps are level with the ground. Use the pegs as a guide; they should be pulled out during this step.
12. The pole will have a shackle that needs to be lifted prior to extending. Be careful of the shackle pinching the pole person's fingers.
13. Lock the shackle into place to secure the height of the tent.
14. Pull on each of the lower guy wires and extend them in line with the seams of the tent.
15. Each guy wire will have an adjuster on it; make sure this adjuster is set to the middle position.
16. Peg the guy wires to the ground using heavy duty pegs.
17. Adjust the guy wires to remove any sag in the lower portion of the tent. The tent should be even in height all the way around.
18. Repeat steps 14–16 with the upper guy wires. The tent guy wires should never cross with other tents.
19. Adjust and tighten all wires and prop up the door wire if necessary.
20. The two door eave wires can be propped up by placing the wire over an improvised pole, tree branch or other object higher than the door entrance. This keeps the doors from sagging and makes it easier to get in and out of the tent and gives the tent greater stability.

TEARING DOWN

Use the following steps to tear down an Arctic tent:

1. Have the pole person enter the tent and hold the pole.
2. Pull out the pegs one at a time and roll up the guy wires and tie them off.
3. Have the pole person lower and remove the pole.

PACKING

Use the following steps to pack an Arctic tent:

1. Lay out the tent with the tent door up and in the centre with zippers closed and remove any debris.
2. Make sure there are no double folds on the underside.
3. Hold the apex securely. The first long fold is made by folding the wings to the centre, with the pegs straight up and down.
4. Straighten and flatten out the Arctic tent.
5. Fold in snow flaps across the base.
6. Make the second long fold, repeating the action for the first long fold.
7. Straighten and flatten out the Arctic tent.

8. Make the third long fold, repeating the action for the first long fold.
9. Straighten and flatten out the Arctic tent.
10. Make the forth long fold by flipping the folds one on top of the other.
11. Make the first cross-fold; fold in the base to the top of the wall.
12. Make the second cross-fold by folding the apex into the base of the inserted pole section, allowing approximately 10 cm of loose fold at the base of the pole section to avoid wear and tear. The top of the pole should be offset.
13. Make the third cross-fold by placing the previous two folds one on top of the other.
14. Insert the tent, base plate and pegs into the bag.
15. Place the remaining two pole sections in the bag beside the tent.
16. Tie up the top of the tent bag.

CONFIRMATION OF TEACHING POINT 2

The cadets' observation of this activity will serve as the confirmation of this TP.

Teaching Point 3 — **Explain and Demonstrate Erecting, Tearing Down and Packing a Civilian-Pattern Dome Tent**

Time: 20 min — Method: Demonstration

These descriptions and instructions will be given as the tent is being erected, torn down and packed.

If the Arctic tent is going to remain erected for the duration of the course/exercise instruct tearing down and packing at the end of the course/exercise.

SELECTING A CIVILIAN-PATTERN DOME TENT

To select a suitable civilian tent, consider the number of people it will need to accommodate, seasons during which it is being used, weather conditions that may be encountered, the weight of the tent and required features.

Seasons and Conditions (http://www.mec.ca)

Three-Season Tents. Designed to offer good ventilation in the spring, summer, and fall, and provide sturdy weather protection in everything but heavy snowfalls and very high winds. Many three-season tents have mesh inner bodies, which reduce condensation, and can often be used without the fly for a cool, bug-proof shelter on hot nights. Three-season tents are airier, less expensive, lighter, more compact and roomier than four-season tents. Their versatility makes them popular with backpackers, paddlers, and cyclists.

MEC Funhouse 4 Tent, by MEC.ca, 2007, Copyright 2007 by MEC.ca. Retrieved December 2, 2007, from http:// www.mec.ca/Products/product_listing.jsp?FOLDER%3C%3Efolder_id=2534374302702837&bmUID=1196614958520

Figure 2-4-18 Three-Season Tent

Four-Season Tents. Built to protect in extreme weather. They usually come with many poles and have low, curved shapes to shield high winds and reduce snow build-up. Extra guy wires provide more staking options. Fabrics tend to be heavier, with thicker waterproof coatings that make them more weatherproof, but less ventilated, and more susceptible to interior condensation. This additional protection means greater weight and packed size, and may be inappropriate for anything other than ski touring, winter camping, or mountaineering.

MEC Mondarack Tent, by MEC.ca, 2007, Copyright 2007 by MEC.ca. Retrieved December 2, 2007, from http:// www.mec.ca/Products/product_listing.jsp?FOLDER%3C%3Efolder_id=2534374302702837&bmUID=1196614958520

Figure 2-4-19 Four-Season Tent

Weight

Tent weights are described as “minimum weight” and “packaged weight”. The minimum weight includes the tent and frame, and the fewest pegs and guy wires necessary to properly set up the tent. Packaged weight includes

the full tent, instructions, stuff sacks, repair swatches, all guy wires and pegs. Conditions permitting, weight can be saved by leaving some pegs and components at home, and improvising with materials available at the site.

Features

Tent Footprints. These are groundsheets that are custom-fit to the tent. Groundsheets protect tent floors from abrasions, increase waterproofness, and help insulate from the cool ground. Most tents have pre-made footprints, which are sold separately.

Vestibules. This is an excellent way to increase the liveability of a tent. They are useful for storing gear, to peel off wet clothing or put on boots. A pole-supported vestibule will be heavier, but generally larger and more storm-proof.

Explain and demonstrate the following. The instructor can use cadets to assist as necessary.

ERECTING

Setting up the Main Body

Use the following steps to set up the main body of a civilian-pattern dome tent:

1. Remove sharp objects that might puncture the tent floor. A footprint beneath the structure is not necessary for a waterproof tent, but it will reduce long-term wear on the tent floor.
2. Assemble all poles carefully.

Shock-corded poles, (bungee cord) are meant to keep pole sections in the proper order, not as an automatic assembly mechanism for poles. Do not hold one section while whipping the rest of the pole back and forth, or toss the poles into the air; either procedure excessively stresses the pole joints and shock cord. Instead, fit poles together section by section, making sure that each piece slides completely into the next. Forcing an improperly assembled pole can damage the pole and/or the tent body and fly.

3. Lay the tent body flat. In windy conditions, peg all the floor corners before proceeding.
4. Lay the poles on top of the tent body so that each one crosses diagonally from one corner to the opposite corner; the two poles should cross in the centre to form an X.
5. Attach the pole clips to the canopy.
6. Fit the pole ends into the grommet tabs at the four corners of the tent.

Have one person lift the top of the tent to loft it up as the tension can cause the other poles to pop out. This is the stage when the greatest stress can be placed on the poles. There is often more than one grommet on each webbing tab to increase or decrease the tautness of the tent to compensate for fabric slackening or tightening caused by changes in humidity. When first erecting the tent, it is best to use the outermost (loosest) grommet on each tab.

7. Starting at a point over one of the doors, attach the clips on the tent to the poles.
8. Peg out the corners of the tent.

Most tents are colour-coded to help users put them up easier.

Attaching the Fly

1. Drape the fly over the tent so that the doors in the fly line up with the doors in the canopy.
2. Attach the Velcro wrap-ties to secure the fly onto the poles. They are usually on the underside of the fly on most tents. Attaching these wrap-ties is very important for strengthening the tent. The wrap-ties allow the poles to reinforce one another in a series of trusses; they also connect the corner guy wire attachment points directly to the poles for maximum stiffness when these guy wires are rigged.
3. Fit all of the grommet tabs on the fly over the appropriate pole ends.

Staking and Guying Out the Tent

Attach, peg out, and tension the four corner guy wires. Rather than thick, heavy poles for strength, most tents employ light, sturdy guy wires as part of their structure. This keeps the tents weight low. The design also makes it very important to securely rig the guy wires in any amount of wind. Not doing so could cause the tent to move in the wind (as with any tent, shelter from trees, rock, or snow walls will make for a quieter night under stormy conditions).

The pegs included with a tent are suitable for general use on relatively soft ground. On very hard-packed ground, use stakes that can withstand the force needed to secure them. On snow, sand, or other loose-packed surfaces, wider T-stakes or aluminum snow stakes will hold better; these stakes hold best buried horizontally. Improvise with other stakes (hiking staffs, ice axes, branches, rocks, trees), using the tents stake loops or cord as required.

Ventilating the Tent

Proper ventilation is the key to minimizing condensation in any tent. Some points to consider are:

- Keep fabric doors open as widely as the prevailing weather permits.
- If bugs are not a problem, leave mesh doors open.
- Open each door from the top down; warm, moist air rises and will escape through high openings.
- If the design of the tent allows, open it at either end or both sides to allow air to flow through.
- On very hot nights, when there will be no rain or dewfall, leave the flysheet off and use the inner tent to keep out bugs.

TEARING DOWN AND PACKING

The most important consideration in taking down a tent is not to stress the poles and fabrics, by following these steps:

1. Disconnect guy wires and release the tension from the tent.
2. Release all the poles. If the tent has pole sleeves, push the poles out of the sleeves instead of pulling them out.

3. To minimize the stress on the bungee cord in the poles and to speed disassembly, fold each pole in half first, and then fold down towards the outsides, two sections at a time.

4. Make sure to remove all of the components from one another prior to storing. A wet tent should be dried prior to packing as the moisture will damage the tent over time.

5. If possible, fold and roll the tent rather than stuffing it into its sack. Rolling makes a smaller package, and causes fewer creases in the polyurethane coating. The tent and poles may be carried separately for easier packing or load sharing.

CARE AND MAINTENANCE

Protecting the Tent

Ultraviolet (UV) damage is the largest hazard for tents. Fabrics should not be exposed to sunlight for extended periods of time; this will eventually result in colour fading and fabric failure. The uncoated fabrics of the tent canopy are most susceptible to damage from UV and should be covered by the more durable fly. If extended exposure is unavoidable, cover the tent with a tarp or a sheet of nylon.

Lighting the Tent

Using a candle lantern in a tent carries definite risks. Never leave a candle lantern burning unattended; always watch for fire hazards from overheating fabrics or spilling wax. Spilling wax can be dangerous, particularly to eyes and other sensitive areas. Use candle lanterns wisely and with extreme caution. Cooking in a tent is strongly discouraged because of fire hazards and carbon monoxide inhalation risks. Unlike campfire smoke and other fumes, carbon monoxide can render someone unconscious without warning.

Eating in the Tent

Mop up spills promptly with water. Many foods, particularly acidic ones like fruit or juices, can weaken synthetic fabrics over time. It is best to eat and store food away from a tent to avoid attracting animals.

Cleaning the Tent

Clean the tent by hand while it is set up, using a sponge, a mild non-detergent soap, and warm water. Rinse thoroughly. Do not dry clean, machine wash, or machine dry. Stubborn stains like tar can be left in place and dusted with talcum powder to prevent transfer to other areas of the tent in storage. After cleaning, a spray-on water repellent designed for synthetic fabrics may be applied to the flysheet if surface water repellent is weakened. This is apparent when water droplets no longer bead on the fabric. If the poles are exposed to salt or salt water, rinse them in fresh water and allow them to dry before storing (while aluminum does not rust, it can become brittle through unseen corrosion over time).

CONFIRMATION OF TEACHING POINT 3

The cadets' observation of this activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in erecting, tearing down and packing a Modular tent will serve as the confirmation of this lesson.

If the tents are going to remain erected for the duration of the course/exercise instruct tearing down and packing at the end of the course/exercise.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

It is important for the cadets to be able to use a Modular tent because they are often used during survival exercises. A cadets' understanding of this lesson will allow them to better assist in the set-up of a survival exercise.

INSTRUCTOR NOTES/REMARKS

Every cadet, as a member of a group, should be given the opportunity to erect, tear down and pack a modular tent during the course.

REFERENCES

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A3-060 B-GG-302-002/FP-001 Canadian Forces. (1974). *Arctic and Sub-Arctic Operations: Part 1*. Ottawa, ON: Department of National Defence.

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ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 5

EO S292.05 – MAINTAIN PERSONAL HYGIENE IN THE FIELD

Total Time:	40 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TPs 1–3 to review, clarify, and emphasize changing clothes regularly, washing their skin and caring for their teeth, and the importance of disposing of waste and waste water.

A practical activity was chosen for TP 4 as it is an interactive way to allow the cadet to experience practicing hygiene in the field.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall be expected to maintain personal hygiene in the field.

IMPORTANCE

It is important for the cadets to know how to maintain their personal hygiene in the field so that they can keep themselves, prevent illness, maintain health and morale and deter the attraction of insects. Keeping themselves and the exercise site clean is an important aspect of a field exercise.

Teaching Point 1 **Explain Changing Clothes Regularly**

Time: 5 min Method: Interactive Lecture

CHANGE CLOTHES REGULARLY

It is important to keep all clothing, especially underclothing and socks, as clean and dry as possible. Clothing, as well as the body, must stay clean and dry. If clothing gets wet—not just damp—take it off and change into something dry. One won't be able to stay warm in wet clothing. Keeping clothes clean will lessen the chances of exposure to rashes and infections. Change clothes, especially underclothing and socks, regularly.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. Why is it important to keep clothes clean?

Q2. What do you do when your clothes get wet?

Q3. What are two important items of clothing to change regularly?

ANTICIPATED ANSWERS

A1. Keeping clothes clean will lessen the chances of exposure to rashes and infections.

A2. If clothes get wet, take them off and change into something dry.

A3. Two important items of clothing that should be changed regularly are underclothing and socks.

Teaching Point 2 **Explain Washing Skin and Caring for Teeth Regularly**

Time: 5 min Method: Interactive Lecture

WASH SKIN REGULARLY

In order to minimize the spread of diseases, hand washing should be enforced when in the field. There are two common approaches to hand washing—hand sanitizers and soap and water.

It is important to always keep the hands clean. Soap and water is an excellent choice for a basic cleanser. Having hand sanitizer is very convenient. Remember to dispose of all waste water.

Washing the body is very important and should be done daily. Pay special attention to areas of the body that are susceptible to rash and fungus infection (the scalp, the crotch and between the toes).

CARE FOR TEETH

In order to minimize oral hygiene problems, teeth should be brushed twice daily. Keeping teeth clean will lessen the chances of gingivitis, mouth diseases and exposure to infections. It is just as important to keep the mouth clean as the rest of the body.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. How can you minimize the spread of disease?

Q2. Where should you pay special attention when washing your body?

Q3. How often should teeth be brushed?

ANTICIPATED ANSWERS

A1. Wash hands regularly.

A2. Pay special attention to areas of the body that are susceptible to rash and fungus infection (the scalp, the crotch and between the toes).

A3. Teeth should be brushed twice daily.

Teaching Point 3 **Discuss the Importance of Properly Disposing Waste and Waste Water**

Time: 10 min Method: Interactive Lecture

USE DESIGNATED ABLUTION SITES

Outhouses and chemical toilets should be utilized whenever possible.

Disposing of waste must be done using good judgement and common sense. In an emergency, urinate at least 60 m away from trails and water sources. Urine will leave a smell and will attract animals once it evaporates.

Human waste should be deposited in holes dug 16–20 cm deep and at least 60 m away from water sources, camps and trails. Mix feces with some soil, using a small stick. Cover and disguise the hole when finished. Toilet paper should be packed out.

PROPERLY DISPOSE OF WASTE WATER

There will always be a quantity of waste water from personal bathing and cooking in the field.

Follow these steps to properly dispose of waste water:

1. Place all waste water in a container.
2. Dig a small hole at least 60 m away from any water source.
3. Pour the waste water into the hole.
4. Fill in the hole with natural materials.

CONFIRMATION OF TEACHING POINT 3

QUESTIONS

Q1. What are the steps to properly dispose of waste water?

Q2. In an emergency how far away should you urinate from trails and water sources?

Q3. Where should human waste be deposited?

ANTICIPATED ANSWERS

A1. Follow these steps to properly dispose of waste water:

1. Place all waste water in a container.
2. Dig a small hole at least 60 m away from any water source.
3. Pour the waste water into the hole.
4. Fill in the hole with natural materials.

A2. Always urinate at least 60 m away from trails and water sources.

A3. Human waste should be deposited in cat holes dug 16–20 cm deep and at least 60 m away from water sources, camps and trails.

Teaching Point 4 **Have the Cadets Participate in a Hygiene Activity**

Time: 15 min Method: Practical Activity

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets participate in a hygiene activity.

RESOURCES

N/A.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

1. Have the cadets change their socks and privately change their underwear.
2. Have the cadets, in a group of boys and a group of girls, wash their faces and underarms.
3. Have the cadets in groups, brush their teeth.
4. Supervise and give feedback on washing and brushing techniques.
5. Have the cadets put away dirty clothes and hygiene items at the end of the activity.
6. Have the cadets dispose of the waste water according to TP 3.

Ensure male and female cadets do not mingle when changing underwear.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 4

The cadets' participation in the hygiene activity will serve as the confirmation for this TP.

END OF LESSON CONFIRMATION

The cadets' participation in TP 4 will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

It is important to know how to maintain your personal hygiene in the field so that you can keep yourself clean and prevent the attraction of insects. Keeping yourself and the exercise site clean is an important aspect of a field exercise.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

C2-016 (ISBN 0-517-88783-5) Curtis, R. (1998). *The Backpackers Field Manual: A Comprehensive Guide to Mastering Backcountry Skills*. New York, NY: Three Rivers Press.

C2-017 (ISBN 0-7627-0476-4) Roberts, H. (1999). *Basic Essentials, Backpacking*. Guildford, CT: The Globe Pequot Press.

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ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 6

EO S292.06 – TIE KNOTS AND LASHINGS

Total Time: 80 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Photocopy knot-tying and lashing instructions, located at Annexes D and E, for each cadet.

Cut lengths of rope and cord for the cadets to tie the knots and lashings. The cord should be 6–7 mm in diameter and 1.5 m in length. Each cadet will require two lengths of cord.

Collect poles from natural resources to be used for demonstration purposes. Poles should be 1.5–2.5 m in length. Each cadet will require two.

Collect natural resources for the rope making demonstration in TP 3.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

A practical activity was chosen for TPs 1–2 as it is an interactive way to allow cadets to practice tying knots and lashings in a safe, controlled environment.

Demonstration and performance was chosen for TP 3 as it allows the instructor to explain and demonstrate making rope from natural resources while providing an opportunity for the cadet to practice and develop these skills under supervision.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have tied knots and lashings.

IMPORTANCE

It is important for the cadets to know how to tie different knots and lashings in order to construct sturdy shelters, snares and camp crafts.

Teaching Point 1 **Demonstrate and Have the Cadet Tie Knots**

Time: 25 min Method: Practical Activity

For this skill lesson, it is recommended that the instruction take the following format:

1. Explain and demonstrate the complete knot while cadets observe.
2. Explain and demonstrate each step required to complete the skill. Monitor cadets as they imitate each step.
3. Monitor the cadets' performance as they practice the complete skill.

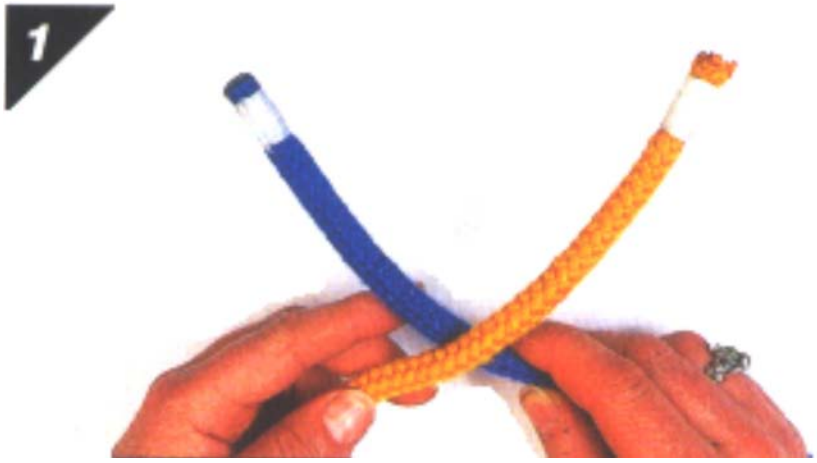
Note: Assistant instructors may be used to monitor the cadets performance.

KNOTS

Reef Knot. The reef knot is used for joining two ropes of equal diameter together. This knot can hold a moderate amount of weight and is ideal for first aid. It may be used when tying slings because the knot lies flat against the body.

Steps for Tying a Reef Knot

1. Place the left hand working end on the top of the right hand working end.



D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 98)

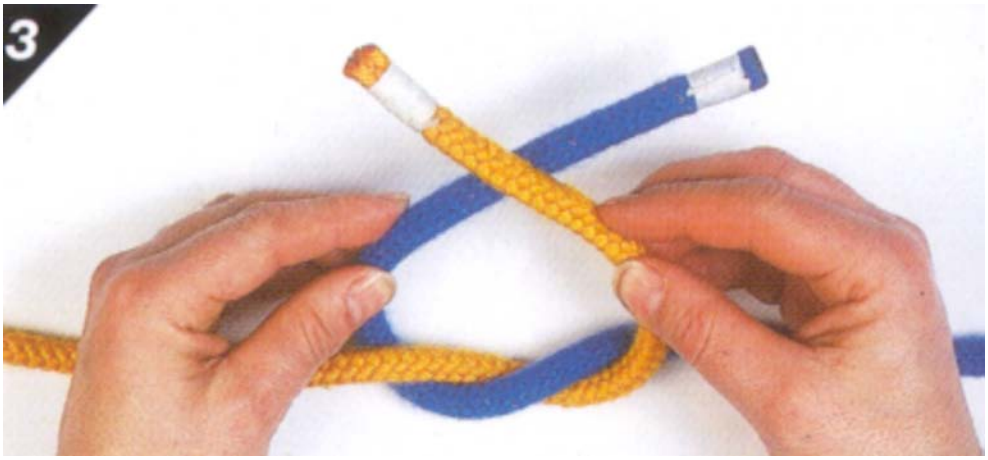
Figure 2-6-1 Step 1

2. Bring the left hand working end under the right hand working end.

D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 98)

Figure 2-6-2 Step 2

3. Place the working end that is now on the right on top of the working end that is now on the left.



D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 98)

Figure 2-6-3 Step 3

4. Bring the working end that is on top under the other working end so it comes out at the same place it entered the knot.

D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 98)

Figure 2-6-4 Step 4

5. Pull tight to complete the reef knot.

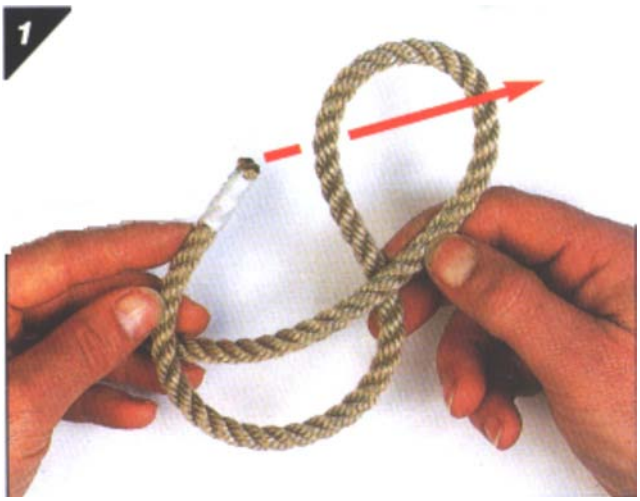
D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 98)

Figure 2-6-5 Step 5

Figure-of-Eight Knot. The figure-of-eight knot is very simple and quick to tie. It makes an ideal stopper and can be used in a survival situation where supplies are limited.

Steps for Tying a Figure-of-Eight Knot

1. Make a crossing turn with the working end passing under the standing part of the rope and then bring the working end over the standing part.



D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 44)

Figure 2-6-6 Step 1

2. Now tuck the working end up through the loop from behind, forming a figure-of-eight.

D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 44)

Figure 2-6-7 Step 2

3. Pull tight to complete the figure-of-eight knot.

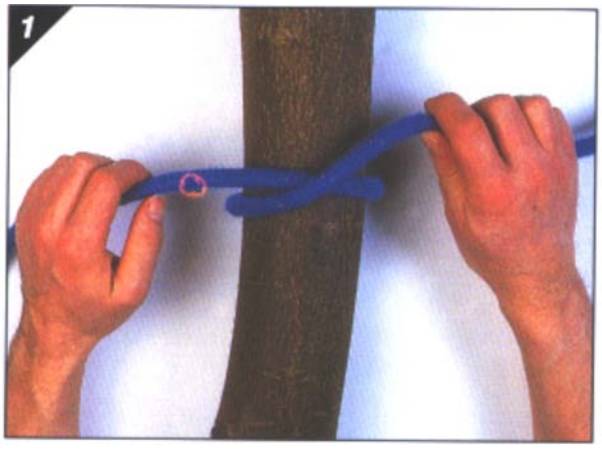
D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 44)

Figure 2-6-8 Step 3

Clove Hitch. The clove hitch consists of two half hitches or crossing turns each made in the same direction. It is used to finish off knots and is necessary in many lashings.

Steps for Tying a Clove Hitch

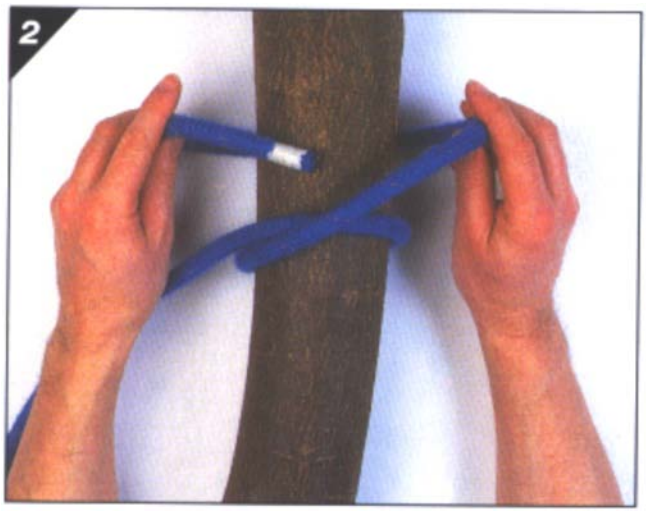
1. Make a turn around a pole/tree bringing the working end of the rope over and trapping the standing part of the rope. This makes the first half hitch.



D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 106)

Figure 2-6-9 Step 1

2. Bring the working end behind the pole/tree, above the first half hitch.



D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 106)

Figure 2-6-10 Step 2

3. Put the working end under the turn just made. This gives the second half hitch and forms the clove hitch.

D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 106)

Figure 2-6-11 Step 3

4. Pull tight to complete the clove hitch.

D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 106)

Figure 2-6-12 Step 4

Bowline. The bowline is a very secure knot that will not slip, regardless of the load applied. Use this knot whenever a non-slip loop is required at the end of a line.

Steps to Tying a Bowline

1. A short distance back from the working end, make a crossing turn with the working part on top. Go on to form the size of the loop you require.

D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 163)

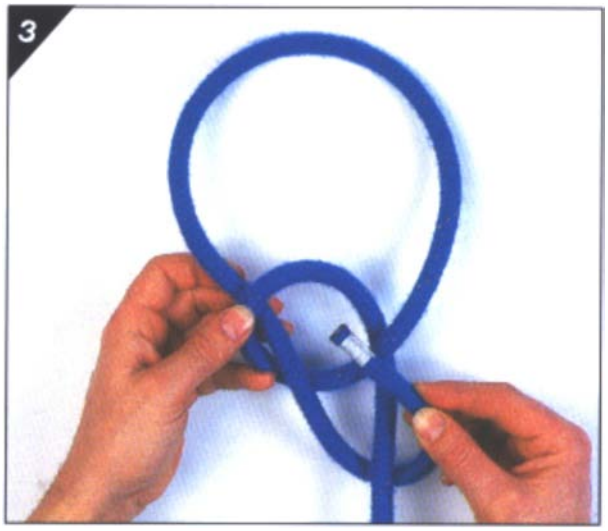
Figure 2-6-13 Step 1

2. Bring the working end up through the crossing turn. It will go under first, and then lie on top of the other part of the turn.

D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 163)

Figure 2-6-14 Step 2

3. Bring the working end around behind the standing part and down through the crossing turn. A good way to remember this is: “the rabbit comes out of the hole, around the tree and back down the hole again”.



D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 163)

Figure 2-6-15 Step 3

4. Pull tight by holding the working end and pulling on the standing part to complete the bowline.

D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 163)

Figure 2-6-16 Step 4

Distribute Annex D to the cadets, so they may practice the knots after the lesson.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in tying knots will serve as the confirmation of this TP.

Teaching Point 2 **Demonstrate and Have the Cadet Tie Lashings**

Time: 25 min Method: Practical Activity

For this skill lesson, it is recommended that the instruction take the following format:

1. Explain and demonstrate the complete lashing while cadets observe.
2. Explain and demonstrate each step required to complete the skill. Monitor cadets as they imitate each step.
3. Monitor the cadets' performance as they practice the complete skill.

Note: Assistant instructors may be used to monitor the cadets performance.

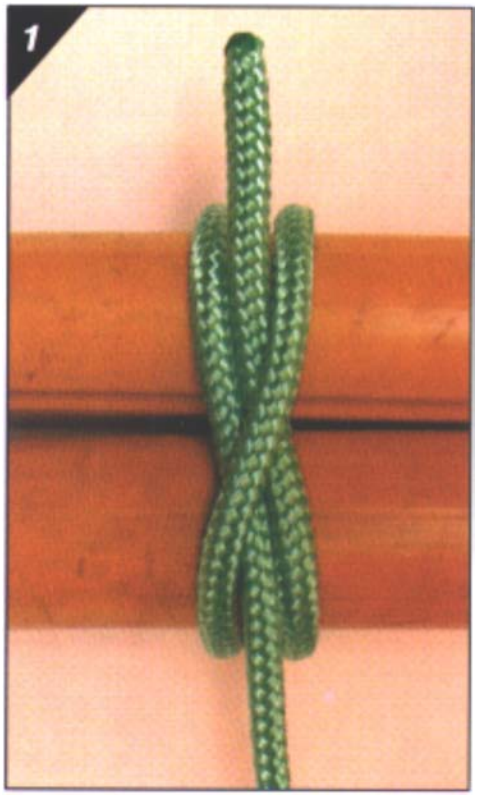
LASHINGS

Round Lashing. Sometimes called a sheer lashing, the round lashing has two distinct uses. First, it creates an "A" frame or set of using a single lashing. Second, two or three round lashings can be used to bind together a couple of poles to make a longer spar. To make an "A" frame, tow poles are put side by side; the lashing is made at one end as illustrated in Figures 2-6-17 to 2-6-23. A slightly different approach is used to join two poles

together to make a longer pole. The procedure is exactly the same, except the initial and final clove hitches are tied around both poles and there is no space left between the poles and no frapping is used. For extra strength to the spar, add extra lashings at the opposite end and middle of the adjoining poles.

Steps to Tying a Round Lashing

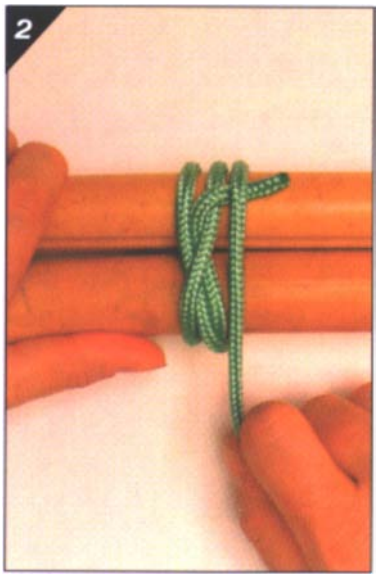
1. Start by making a clove hitch around both poles.



D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 184)

Figure 2-6-17 Step 1

2. Wrap around both poles, trapping the end of the clove hitch.



D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 184)

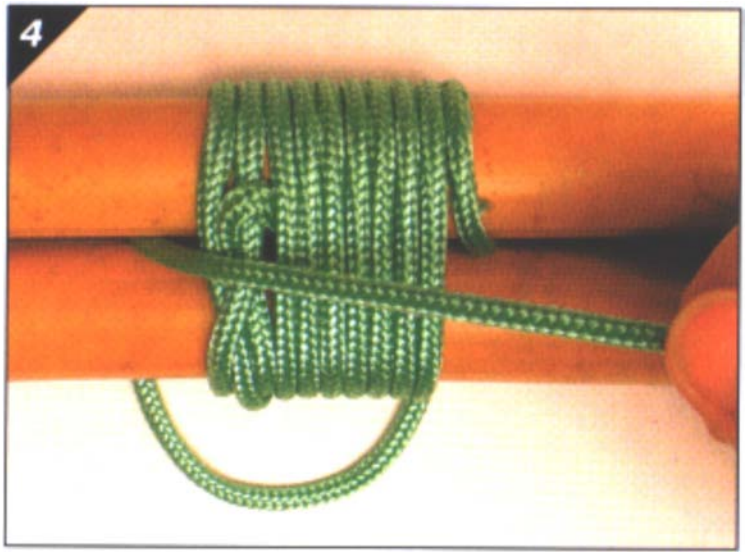
Figure 2-6-18 Step 2

3. Carry on making eight to ten more turns round the pair of poles.

D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 184)

Figure 2-6-19 Step 3

4. The lashing could now be finished with a clove hitch around both poles or put in a couple of frapping turns by bringing the end of the rope between the two poles.



D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 185)

Figure 2-6-20 Step 4

5. Finish off with a clove hitch around one of the poles.

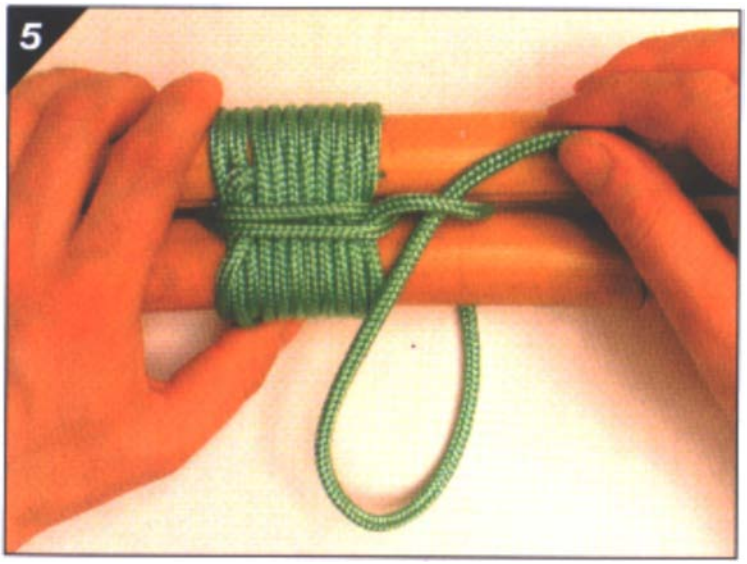


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Figure 2-6-21 Step 5

6. Pull tight to finish the round lashing with the poles parallel.

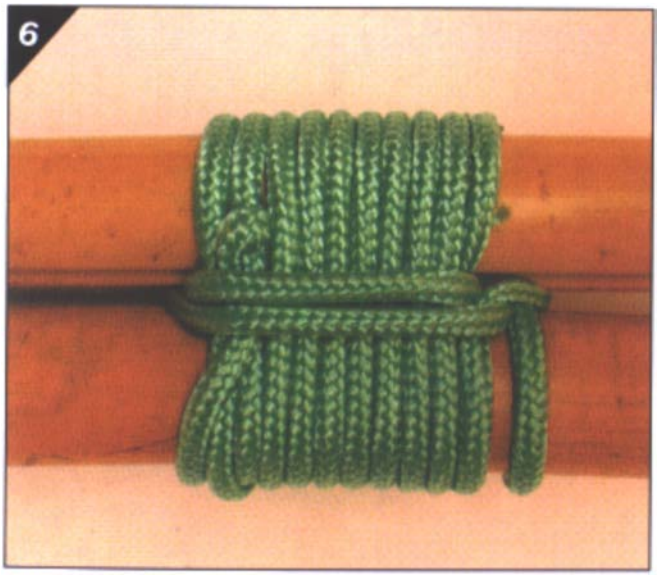

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Figure 2-6-22 Step 6

7. If being used for an “A” frame then open the poles.

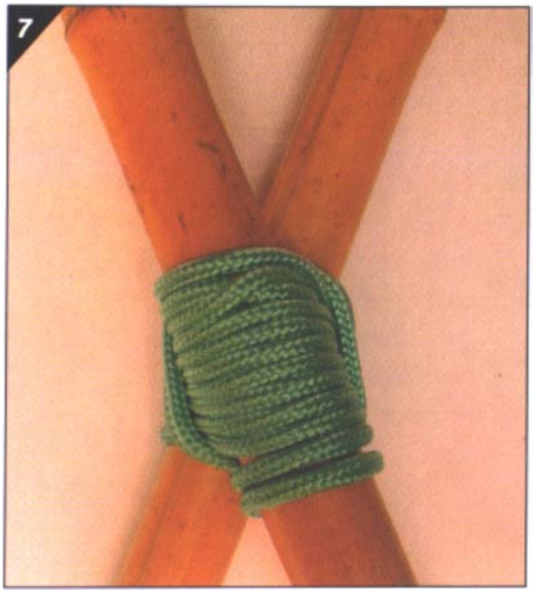

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Figure 2-6-23 Step 7

Square Lashing. A square lashing secures two poles together at 90 degrees and can be used in the construction of shelters and camp crafts. The cord used to make the lashing should be considerably smaller than the size of the poles. For the lashing to be effective, each turn must be pulled as tight as possible as it is made.

Steps to Tying a Square Lashing

1. With the vertical pole on top of the horizontal pole, make a clove hitch on the vertical pole just below the horizontal pole.

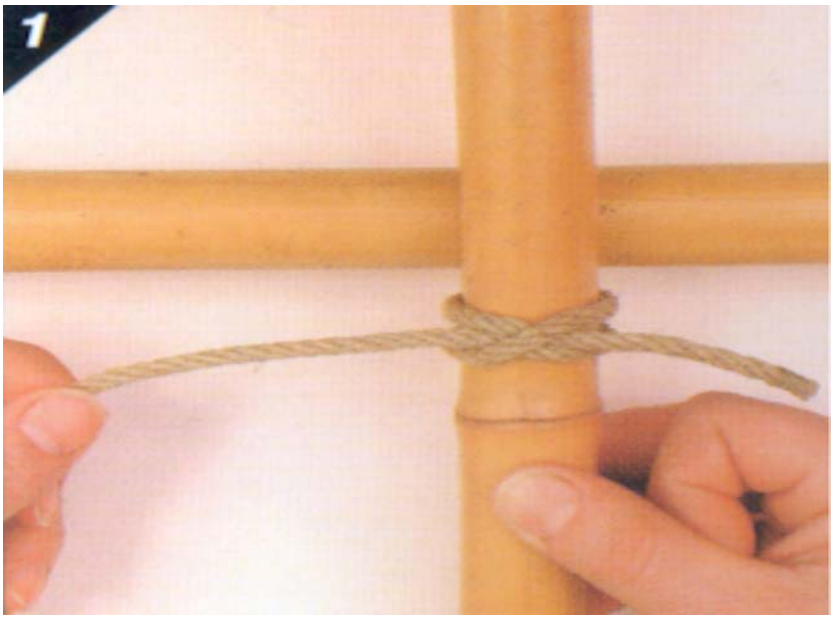

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Figure 2-6-24 Step 1

2. Bring all the cord around behind the horizontal pole.

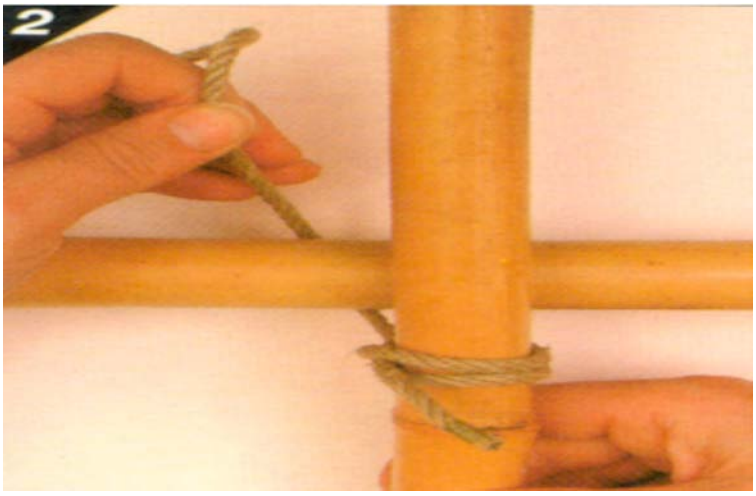

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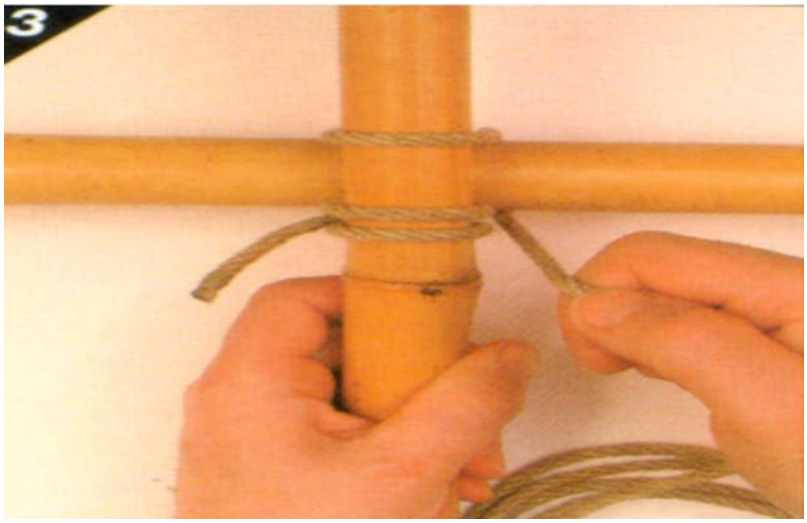
Figure 2-6-25 Step 2

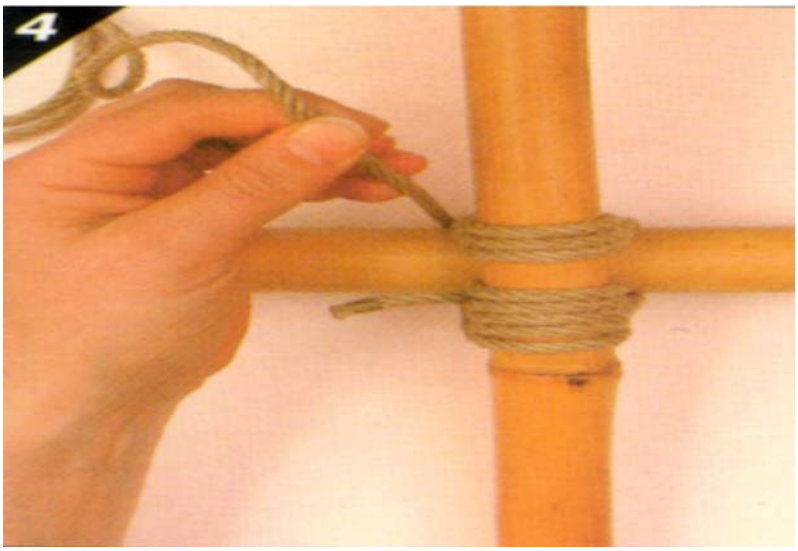
3. Bring the cord over the vertical pole and back behind the horizontal pole to the clove hitch. Pull tight.



D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 181)

Figure 2-6-26 Step 3

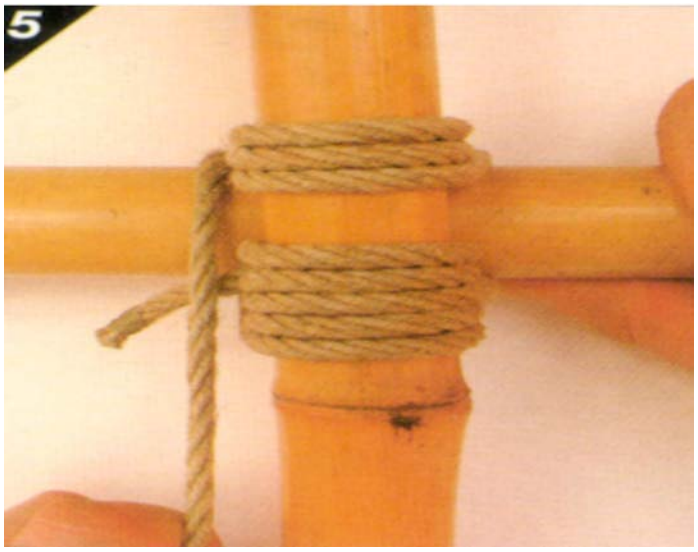
4. Carry on making two or three more complete turns around the two poles, pulling tight after each turn.



D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 181)

Figure 2-6-27 Step 4

5. After passing the clove hitch, bring the cord around the horizontal pole from behind and start to wrap around the junction between the two poles. These are frapping turns—pull them as tight as possible.



D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 181)

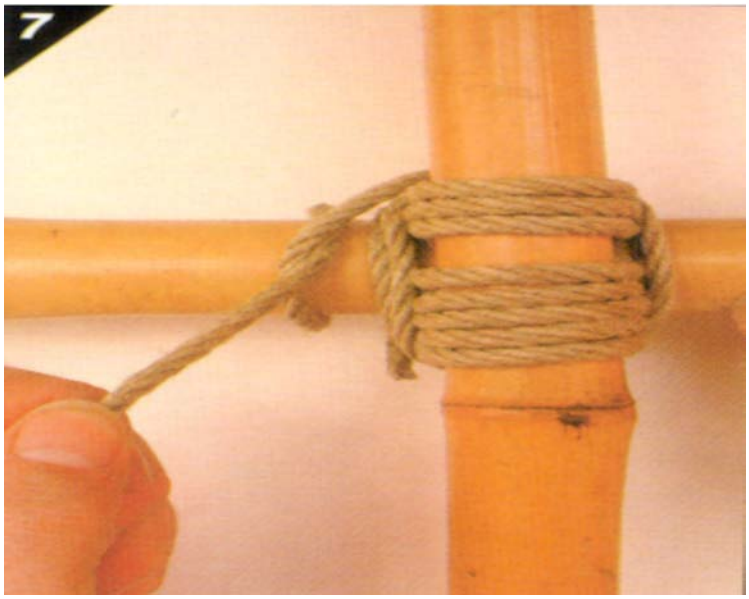
Figure 2-6-28 Step 5

6. Make two frapping turns.

D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 181)

Figure 2-6-29 Step 6

7. Finish off with a clove hitch around the horizontal pole.



D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 181)

Figure 2-6-30 Step 7

8. Pull tight to complete the square lashing.

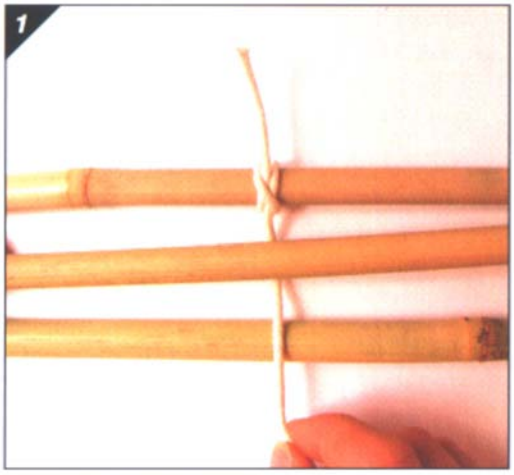
D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 181)

Figure 2-6-31 Step 8

Figure-of-Eight Lashing. The figure-of-eight lashing is used to join three poles together to create a tripod. The tripod can be used for creating signal fires, shelters and camp crafts in a survival situation.

Steps to Lashing a Figure-of-Eight Lashing

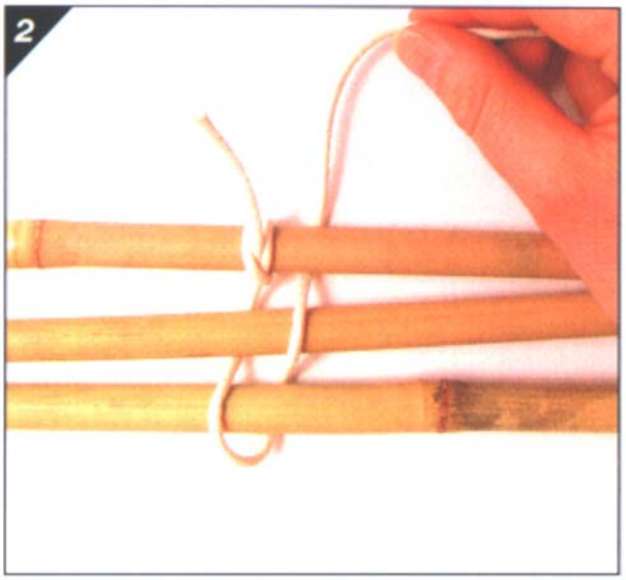
1. Start with a clove hitch around one of the poles, and lead the rope under and over the other two poles.



D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 187)

Figure 2-6-32 Step 1

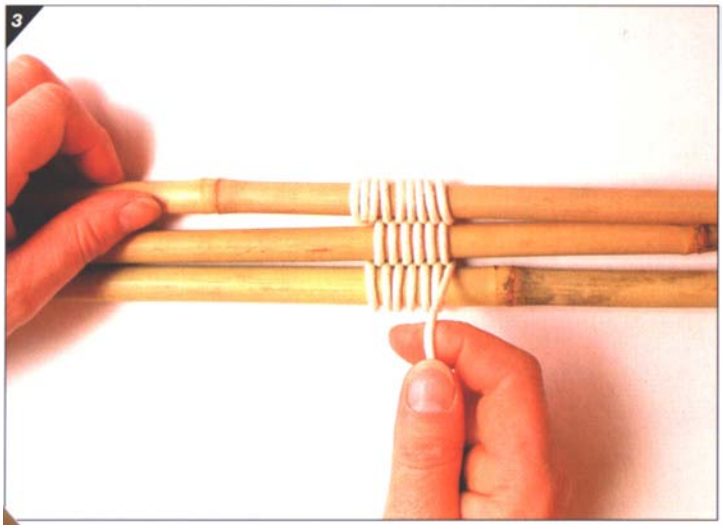
2. Go around the pole furthest away from the start and weave the rope back over and under.



D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 187)

Figure 2-6-33 Step 2

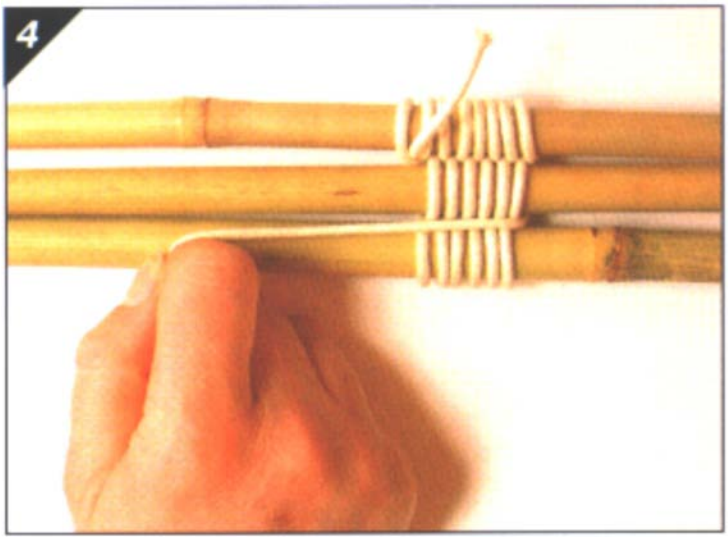
3. Continue to weave the rope in the figure-of-eight manner for seven or eight full passes before bringing the rope up between two of the poles.



D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 187)

Figure 2-6-34 Step 3

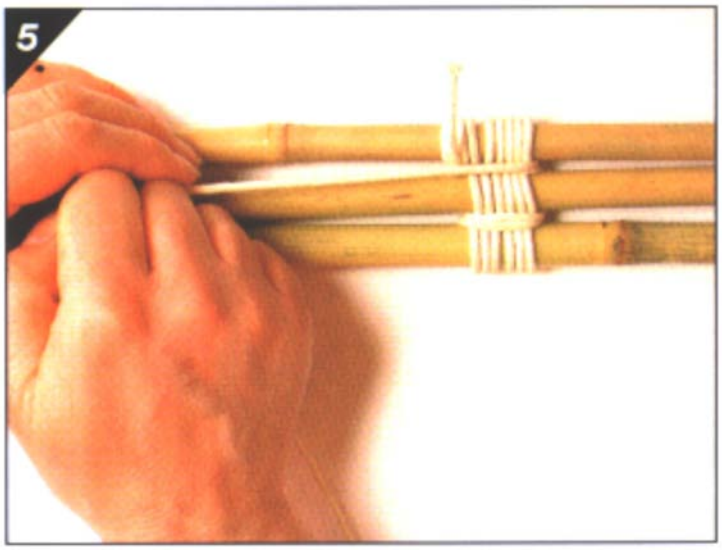
4. Pull the rope parallel to the poles and start to put in some frapping turns.



D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 188)

Figure 2-6-35 Step 4

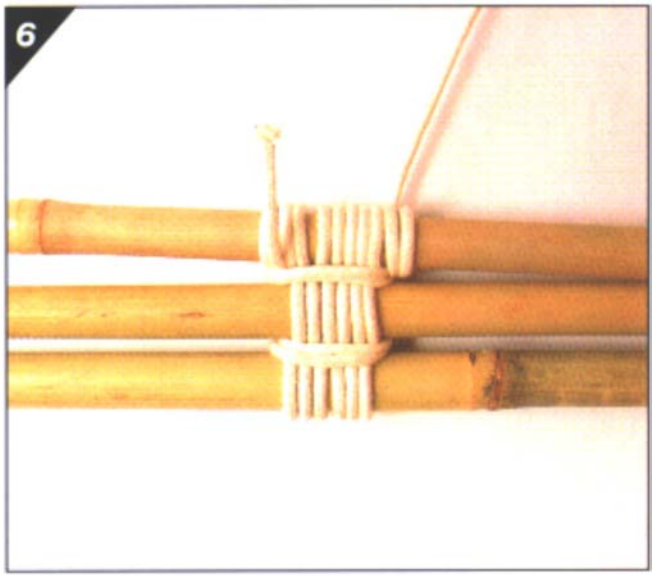
5. After making frapping turns between the first two poles move on to make frapping turns around the other pair of poles.



D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 188)

Figure 2-6-36 Step 5

6. Finish off with a clove hitch around the pole from which you first started.



D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 188)

Figure 2-6-37 Step 6

7. Open to create tripod.

D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 188)

Figure 2-6-38 Step 7

Distribute Annex E to the cadets, so they may practice the knots after the lesson.

CONFIRMATION OF TEACHING POINT 2

The cadets' participation in tying lashings will serve as the confirmation of this TP.

Teaching Point 3 **Explain, Demonstrate and Have the Cadet Make Rope From Natural Resources**

Time: 20 min Method: Demonstration and Performance

Using natural resources gathered prior to this lesson, explain and demonstrate making rope with different materials.

Vines, grasses, rushes, barks, palms and animal hairs can all be used to make rope or cord. The tendons from animals' legs also make good strings, but they tend to dry very hard.

The stems of nettles make first-class ropes and those of honeysuckle can be twisted together to make light lashings. The stronger the fibre, the stronger the rope. Some stiff fibres can be made flexible by steaming or warming.

While pliable vines and other long plant stems can often be used as they are, they may become brittle as they dry out. A rope made from plant fibres which are twisted or plaited together will be more durable.

SOURCES OF FIBRES

Nettles. (Ultra Dioica) Is an excellent source of fibres but requires preparation. Choose the oldest available plants and those with the longest stems. Soak them in water for 24 hours, and then lay them on the ground and pound with a smooth stone. This will shred the outer surface, exposing the fibrous centre. Tease and comb to remove the fleshy matter. Hang to dry. When dry, remove and discard the outer layer. Twist the fibres into long threads; plaiting or twisting together to make a strong rope.

Palms. Usually provide a good fibre. Leaves, trunks and stalks can all be used. The husk of a coconut is used commercially to make ropes and matting.

Dogbane. (Appocynam Cannaninum) Stems also provide very good fibre, which is easy to work with.

Barks. Willow bark easily produces very good fibre. Use the new growth from young trees. The dead inner bark of fallen trees and tree branches should not be overlooked. But if the tree has been down too long it may have decayed too much, so test it for strength.

Roots. The surface roots of many trees make good lashings. Those that run just under, or even under the surface, are often pliable and strong. The roots of the spruce are very strong. The Natives of North America used them to sew birch bark together to make canoes.

Leaves. Plants such as those of the lily family, especially aloes, have very fibrous leaves. Test by tearing one apart. If it separates into stringy layers it can provide fibres to make into rope. Soak to remove the fleshy parts.

Rushes, Sedges and Grasses. These should be used when still green. Pick the longest specimens available.

Animal Tendons. These are useful for tying one thing to another. They must be used wet.

ACTIVITY

Time: 15 min

OBJECTIVE

The objective of this activity is for the cadets to make rope from natural materials.

RESOURCES

Knife.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

1. Divide the cadets into groups of no more than four.
2. Have the cadets locate natural materials in the area.
3. Have the cadets practice making rope from the natural materials.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in making rope from natural materials will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in the knot-tying activities will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

It is important for the cadets to select the appropriate knot and lashing when constructing shelters, signal fires or camp crafts for safety and quality. Knowing different knots and lashings is a skill that can be put to use in constructing shelters, signals, cooking and camp crafts.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

C3-002 (ISBN 0-00-653140-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.

C3-026 (ISBN 1-55267-218-2) Pason, D. (2001). *Pocket Guide to Knots and Splices*. London, England: PRC Publishing Ltd.

ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 7

EO S292.07 – USE TOOLS

Total Time: 80 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Ensure all tools are properly sharpened by trained personnel. Cadets will not sharpen tools.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

Demonstration and performance was chosen for TPs 1 and 3 as it allows the instructor to demonstrate using tools, while providing an opportunity for the cadet to practice the skill under supervision.

A demonstration was chosen for TP 2 as it allows the instructor to demonstrate the skills while providing the cadets with knowledge on the subject matter.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have used tools.

IMPORTANCE

It is important for the cadets to be able to use tools on a survival training exercise. Tools support survival training by assisting the cadets in the set up of a survival exercise site, erecting tents and starting fires. The cadets need to know how to safely use tools to prevent accidents.

Teaching Point 1 **Explain, Demonstrate and Have the Cadets Handle, Pass and Store Tools**

Time: 25 min Method: Demonstration and Performance

For this skill lesson, it is recommended that the instruction take the following format:

1. Explain and demonstrate handling, passing and storing tools while the cadets observe.
2. Explain and demonstrate each step required to complete the skill. Monitor the cadets as they imitate each step.
3. Monitor the cadets' performance as they practice the complete skill.

Note: Assistant instructors may be used to monitor the cadets' performance.

HANDLING TOOLS

All tools need to be handled with great care and control. For this lesson the focus will be on the safe handling and passing of a knife, an axe and a bow saw since these tools are most dangerous when used incorrectly.

These safety considerations should transfer to all other tools that are used during a survival training exercise.

Knives

Previous to the late 19th century, outdoorsmen and military personnel did not use knives that were notably different from the knives used by butchers. The metal was relatively thin and the handles were often two wooden slabs riveted to the tang (the metal that extends into the handle). Around the turn of the century, the modern concept of the hunting knife was introduced. These knives use heavier blades, cross guards (a bar of metal at right angles to the blade) and pommels (a knob on the end of the knife handle).

During WWII, survival knives were issued to aircraft crew, as it was a real possibility that personnel might be shot down over wilderness or behind enemy lines. Frequently lifeboats aboard naval vessel contained survival kits including knives.

In a survival situation, a knife has to serve a number of purposes such as chopping, cutting, slicing and sawing. A good, practical knife will usually be made out of high-carbon, spring-tempered steel. Not only can this withstand heavier and more intense use, it also tends to stay sharp longer. Some uses of a knife in a survival situation include:

- making makeshift tools out of wood, for example a fishing pole or a bow for use in fire lighting;
- chopping or splitting wood and making shavings to start a fire;
- cutting through thickets and branches when trying to navigate out of a particular dense area of forest;
- hunting as one may need to skin a snared animal or to gut a fish; or
- preparing bows to be used on a shelter.

Multi-Tools and Pocket Survival Tools (PST). These are knives that include many tools that may be useful in survival situations. The blades are usually small and multi-tools should be accompanied by a larger knife. In urban emergency situations, these knives may be more useful as one may need a screwdriver or set of pliers over a knife.

Knife Blades

Most blades are made of stainless steel, an alloy that contains chromium to make it corrosion-resistant. Chromium is softer than steel, so stainless blades offer a compromise between rust resistance, edge retention and ease of sharpening.

Numbers marked on the blade (usually a 400 number) indicate the type of alloy used. For example, a marine knife that will be exposed to salt-air and spray is usually made of rust-resistant, high-chromium steel such as 420. A blade intended for frequent cutting or food preparation will be harder steel such as 440.

Letters A, B, and C indicate progressively higher levels of carbon and thus harder steel. (AUS-6 is a Japanese steel roughly equivalent to 440A). A harder blade will hold a sharp edge longer, but will be more difficult to sharpen.

Titanium blades are lighter than steel, but generally cannot be hardened to the same degree.

Serrated or half-serrated blades take longer to sharpen, but are good for catching and cutting smooth surfaces such as rope or ripe tomatoes.

"Learn, Choosing a Knife", MEC.ca, Copyright 2007 by Mountain Equipment Co-op. Retrieved November 18, 2007, from http://www.mec.ca/Main/content_text.jsp

How to Handle a Knife

When handling a knife the cadet must practice the following principles:

- Always cut away from the body, never toward.
- If the knife is dropped, let it fall to the ground as trying to catch it could cause serious injury.
- Never point a knife at anybody.
- If the knife is of the folding variety, keep it folded away when not in use or keep it in a sheath.
- Never walk or run around with an open or unsheathed knife. Use the knife in one location and close or sheath the knife before moving.
- Ensure the knife is only used when the user can clearly see what they are doing. If it is dark, make sure a source of light is positioned nearby.

More injuries are caused and more damage is inflicted on a knife from incorrect use. It is important to remember what the knife is designed to do. It is not designed to pry lids off tins. This is not only dangerous, but will also damage the tip. The handle or butt is not designed to be a hammer. A knife can assist greatly during a survival situation but it is useless if it breaks by using it as a substitute for another tool.

Axes

The axe is a tool that has been used for over a thousand years to shape, split and cut wood, harvest timber, as well as a weapon and a ceremonial or heraldic symbol. The axe has many forms and specialized uses but generally consists of an axe head with a handle. It is considered a simple machine. The following are the most common types of axes.

Felling Axe. Used to cut across the grain of wood, as in the felling of trees. The axe comes in single or double bit (the bit is the cutting edge of the head) forms and many different weights, shapes, handle types and cutting geometries to match the characteristics of the material being cut.

"Axe", Wikipedia.org, Copyright 2007 by Wikipedia.org. Retrieved November 19, 2007, from http://en.wikipedia.org/wiki/Image:Axt_Handwerk.jpg

Figure 2-7-1 Felling Axe

Splitting Axe. Used to split with the grain of the wood, also known as a "maul". Splitting axe bits are more wedge-shaped. This shape causes the axe to rend the fibres of the wood apart, without having to cut through them, especially if the blow is delivered with a twisting action at impact.

"Maul", Wikipedia.org, Copyright 2007 by Wikipedia.org. Retrieved November 19, 2007, from http://en.wikipedia.org/wiki/Image:Maul-1.jpg

Figure 2-7-2 Splitting Axe

Broadaxe. Used with the grain of the wood in precision splitting. Broad axe bits are chisel-shaped (one flat and one bevelled edge) facilitating more controlled work.

"Broadaxe", Wikipedia.org, Copyright 2007 by Wikipedia.org. Retrieved November 19, 2007, from http://en.wikipedia.org/wiki/Image:Broadaxe.jpg

Figure 2-7-3 Broadaxe

Adze. A variation featuring a head perpendicular to that of an axe and is used to smooth the surface of rough-cut wood. The user stands astride a board or log and swings the adze downwards toward their feet, cutting off a piece of wood and walking backwards as they go.

"Adze", Wikipedia.org, Copyright 2007 by Wikipedia.org. Retrieved November 19, 2007, from http://en.wikipedia.org/wiki/Image:Adze.jpg

Figure 2-7-4 Adze

Handling an Axe

Improper axe-handling will seriously deplete energy reserves within just a few minutes and result in the onset of fatigue. Excessive sweating leads to dehydration, making clothes and hair damp; this increases heat loss and the chance of hypothermia. Hypothermia, dehydration and fatigue all adversely affect the ability to focus and concentrate and could result in severe injury.

Safe axe-handling requires considerable focus and concentration. Learning how to use an axe takes time and practice. Axes are good tools to use during survival exercises to support training and can be used under supervision when emergency personnel are accessible.

Avoid using an axe in a survival situation. Axe injuries can be severe and most survival tasks can be accomplished more safely and more efficiently without one.

Inexperienced axe users tend to:

- work too hard or too fast;
- develop blisters;
- become quickly fatigued without stopping to rest and recover;
- overexert themselves until they are perspiring profusely; or
- injure themselves or others.

Important considerations when handling an axe:

Demonstrate, explain and have each cadet practice handling an axe (as illustrated in Figure 2-7-5).

- The axe has two important parts: the head and the handle. The two parts must fit together tightly. The handle should not have any splits or chips in it.
- Always carry an axe by its head. Place two fingers on one side, a thumb on the other and grip the neck with the other fingers. The handle should face the floor and the blade should face the front.
- Another safe alternative carry, is to cradle the axe upside down in the hand, keeping the arm close to the body. Make sure the axe bit is facing forward with the fingers out of the way, so if the user falls, the axe will go into the ground and not the body.

Scoutbase.org, Copyright 2007 by Scoutbase.org. Retrieved November 19, 2007, from http://www.scoutbase.org.uk/library/hqdocs/facts/pdfs/fs315070.pdf

Figure 2-7-5 Axe Carrying

Never use an axe as a hammer, even though one side is usually shaped like one. Axes are not designed to hit metal or stone and can easily break. The head may also come off, causing severe injuries.

Bow Saw

A metal-framed saw in the shape of a bow with a coarse wide blade. Bow saws are used for wood too large for using a hand-axe and are often safer and easier than the felling axe for cutting small timber.

"Bow Saw", Wikipedia.org, Copyright 2007 by Wikipedia.org. Retrieved November 19, 2007, from http://en.wikipedia.org/wiki/Image:Bow_saw.JPG

Figure 2-7-6 Bow Saw

Handling a Bow Saw

A bow saw is a dangerous tool when used incorrectly. Always handle with great care. The length of the blade makes it more dangerous than an axe. It is very easy to inflict injury if the user trips or falls. Always carry a saw by the handle, with the blade facing the ground. If the user was to trip or fall while carrying the bow saw, the blade would strike the ground and not the body.

PASSING TOOLS

Demonstrate, explain and have each cadet practice passing tools.

When passing tools that have a sharp edge, adhere to the following steps:

1. The passer communicates the intent to pass the tool.

2. The receiver gives both a verbal response and eye contact that they accept.
3. The passer and the receiver stand side by side, facing the same direction.
4. The passer holds out the tool with both hands and the sharp edge out.
5. The passer waits for the recipient to place both hands on the tool.
6. The passer asks the recipient if they have control.
7. The recipient states that they have control.
8. The passer releases control of the tool.

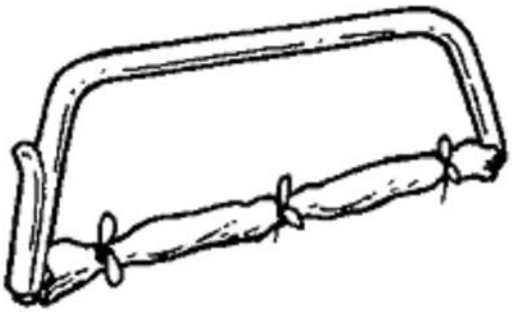
These steps may seem overstated, but most accidents that occur when passing tools are a result of poor communication. It takes very little force for a sharp tool to severely injure.

STORING TOOLS

Demonstrate, explain and have each cadet practice storing tools.

When storing tools, adhere to the following:

- Always clean tools before storing.
- Check tools frequently to ensure they are operating properly.
- Always choose a tree close to the survival site to store tools or build a tool shelter.
- All tools should be stored in a common area that is clearly identifiable.
- Axes and bow saws should be masked or stored in a secure case when not in use (as illustrated in Figure 2-7-7).
- Keep all tools out of the elements.
- Do not leave an axe or a bow saw embedded in a stump; sap will adhere to the tool and it will become difficult to remove.
- Do not leave tools lying on the ground. Lean them against a tree if taking short breaks.
- Always be aware of people when storing a tool against a tree for a brief time. Remember that the user is responsible for the tool from the time it is taken from its case or storage area until it is returned.



scoutingresources.org/camping, Copyright 2007 by Scouting Resources. Retrieved November 19, 2007, from http://www.scoutingresources.org.uk/camping_axe.html

Figure 2-7-7 Storing a Bow Saw

Scoutmaster, Knots and Pioneering, Copyright 2007 by Amazon.com, Inc. Retrieved November 18, 2007, from http://scoutmaster.typepad.com/.shared/image.html?/photos/uncategorized/chip5_copy_copy.jpg

Figure 2-7-8 Tool Rack

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in handling a knife, an axe and a bow saw, safely passing and storing tools will serve as the confirmation of this TP.

Teaching Point 2 **Explain and Demonstrate Sharpening Tools**

Time: 15 min Method: Demonstration

KNIVES

To preserve the life of a knife, only use it for its intended purpose. Do not to use blades to pry things, punch holes, as a hammer or screwdriver.

Cleaning

To clean a folding knife, open the blades and tools and rinse with warm water. It may be helpful to scrub it with an old toothbrush. Just be careful when handling the knife while the blades are open.

When the knife is completely dry, lightly oil it with sewing machine oil or use cooking oil if you cut food with your knife. Wipe off any excess oil and close the blades.

It is important to keep the edge of a knife blade sharp, as a dull knife can be more dangerous than a sharp one. Do not exert too much pressure or use force to make a blade cut through something. By keeping the knife clean and dry it will not require sharpening as often.

Sharpening

When sharpening a knife it is important to keep it secure, maintain a uniform sharpening angle on both sides and be careful of cutting fingers. Keep in mind that over-sharpening will weaken the blade.

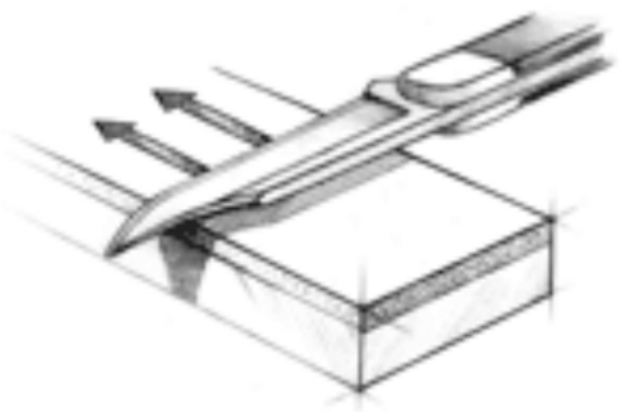
There are different types of sharpening tools, including:

- a sharpening stone (dry or whetstone),
- a sharpening steel, and
- a sharpening tool.

A Sharpening Stone

Sharpen a knife as soon as it becomes dull. Use only a quality stone and apply lubricant as specified for the stone. To polish a blade that has stains on it use wood ash as it will not scratch the blade. Use the following steps when sharpening a knife with a sharpening stone:

1. Apply a light coating of oil (if it is a “whetstone”) to the stone to protect the surface.
2. If it is a combination stone use the medium grit side first, hold the blade at 20–30 degrees.
3. Start where the blade meets the handle and draw the full length of the blade across the stone with steady pressure. Repeat three or four times on each side.
4. To remove any small burrs, complete the three or four strokes using the fine grit side of the stone at the same angle.
5. Test for sharpness by cutting something, not by drawing the fingers across the blade.
6. Repeat until the desired sharpness is achieved.
7. Clean and dry the stone following the manufacturers’ instructions.

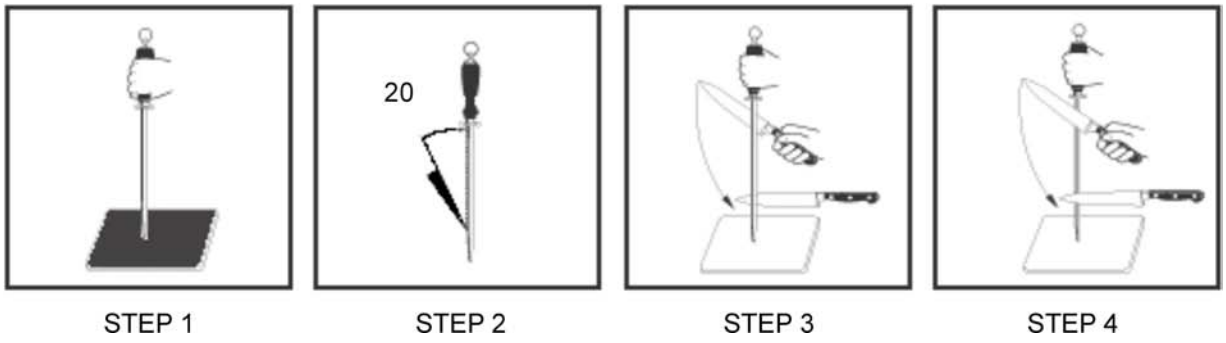


Chesapeakeknifeandcutley.com, Copyright 2007 by PAX River Enterprises. Retrieved November 19, 2007, from http://www.chesapeakeknifeandcutlery.com/index.asp?PageAction=Custom&ID=49

Figure 2-7-9 A Sharpening Stone

A Sharpening Steel

A sharpening steel is faster and easier to use than a stone, but is only used to maintain a fine edge, not produce one. A 20-degree angle should be used between the steel. Starting at the base of the blade, draw the knife down the rod and end at the blade's tip. Repeat two or three times on each side then test.



D Cdts 3, 2007, Ottawa, ON: Department of National Defence

Figure 2-7-10 A Sharpening Steel

A Sharpening Tool

Sharpening tools can be very effective, but usually cost a lot more than stones or steels. To sharpen a knife, pull the blade through the tool until the desired sharpness is achieved.

Premiercutlery.co.uk, Copyright 2007 by Priemer Cutlery, Sheffield, England. Retrieved November 19, 2007, from http://www.premiercutlery.co.uk/show_item/sharpeners/chantry/550r

Figure 2-7-11 Sharpening Tool

AXES

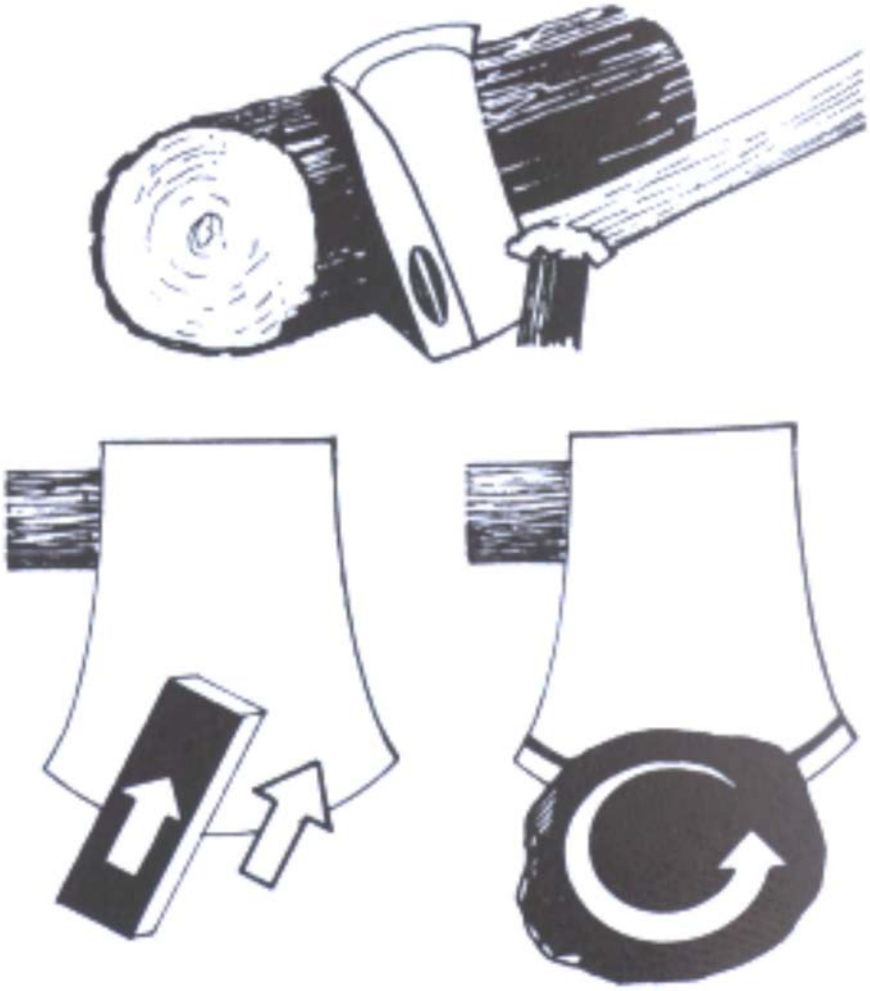
Sharpen the axe with a fine file and a combination whetstone (a stone that has a different grit on each side and requires oil to use). The following steps are used to sharpen an axe:

1. Look at the blade to determine how much sharpening is required.
2. Get a piece of cardboard, about a 5 cm square, for a hand guard and punch a hole straight in the middle, slipping it over the handle of the file.
3. Brace the axe against a log and stake the other side (as illustrated in Figures 2-7-12 and 2-7-13).
4. Using the file, gently file one side pushing in the direction of the blade at a 20–30 degree angle. Repeat 5–10 times on each side.
5. Test the sharpness of the blade by sliding a piece of paper over it, if the paper cuts the blade is sharp.
6. If not, then start by oiling the fine grit side of the whetstone.
7. Hold the stone so that the fingers do not protrude onto the blade.
8. Move the whetstone in circular motions along one side of the blade, until the axe easily cuts through a piece of paper.

It is good practice to sharpen the axe after use and before storing.

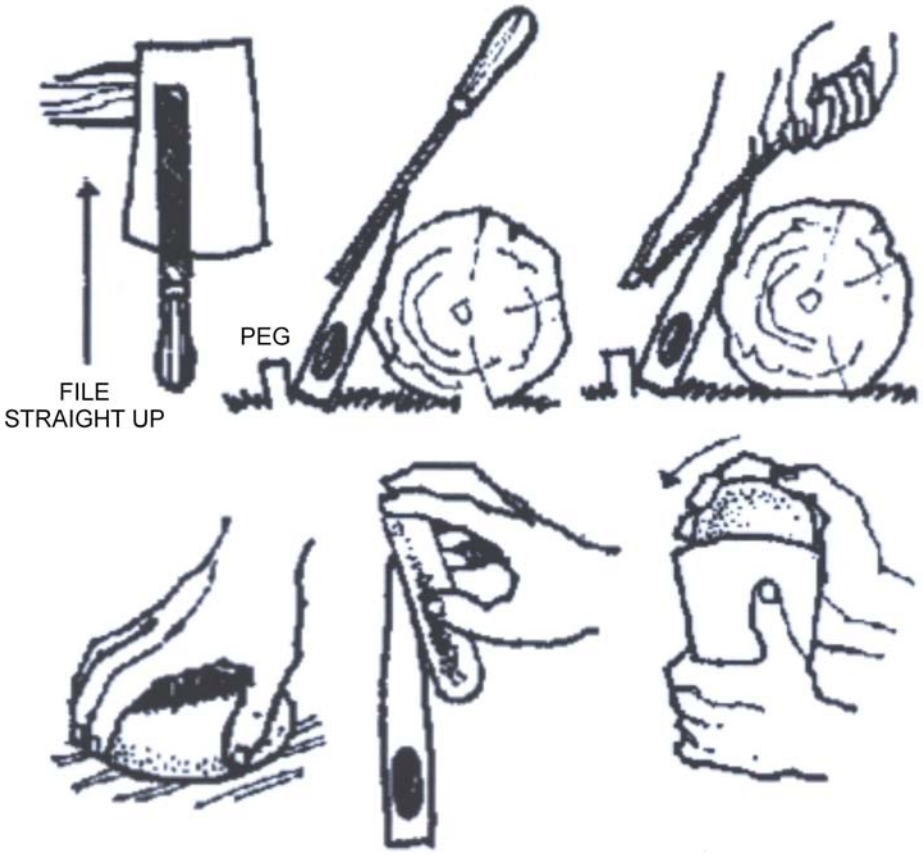
The best way to keep an axe sharp is to use and store it properly. Do not stick it in the dirt or leave it in a tree. Always clean it after each use and apply oil to the blade.

In the winter, warm the head of the axe under an armpit or near the fire. The metal can become brittle when frozen.



J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 304)

Figure 2-7-12 Axe Sharpening 1



Scoutingresources.org/camping, Copyright 2007 by Scouting Resources. Retrieved November 19, 2007, from http://www.scoutingresources.org.uk/camping_axe.html

Figure 2-7-13 Axe Sharpening 2

A bow saw should be oiled to prevent it from rusting. As blades are relatively cheap, it is advisable to replace the blades rather than attempting to sharpen them.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. What is the difference between using a sharpening stone and a sharpening steel?

Q2. How do you clean and care for your knife properly?

Q3. What is the best way to keep an axe sharp?

ANTICIPATED ANSWERS

A1. Steels are faster and easier to use than a stone, but steels are only used to maintain a fine edge, not produce one. A 20-degree angle should be used on the steel and starting at the base of the blade draw the down the rod ending at the blades tip and repeat two or three times on each side then test.

A2. To clean a folding knife, open the blades and tools and rinse with warm water. It may be helpful to scrub it with an old toothbrush. Just be careful when handling the knife while the blades are open. When the knife is completely dry, lightly oil it with sewing machine oil, or use cooking oil if you cut food with your knife. Wipe off any excess oil and close the blades.

A3. The best way to keep an axe sharp is to not let it get dull. Do not stick it in the dirt or leave it in a tree. Always clean it after each use and apply oil to the blade.

Teaching Point 3 **Explain, Demonstrate and Have the Cadets Cut Wood**

Time: 30 min Method: Demonstration and Performance

For this skill lesson, it is recommended that the instruction take the following format:

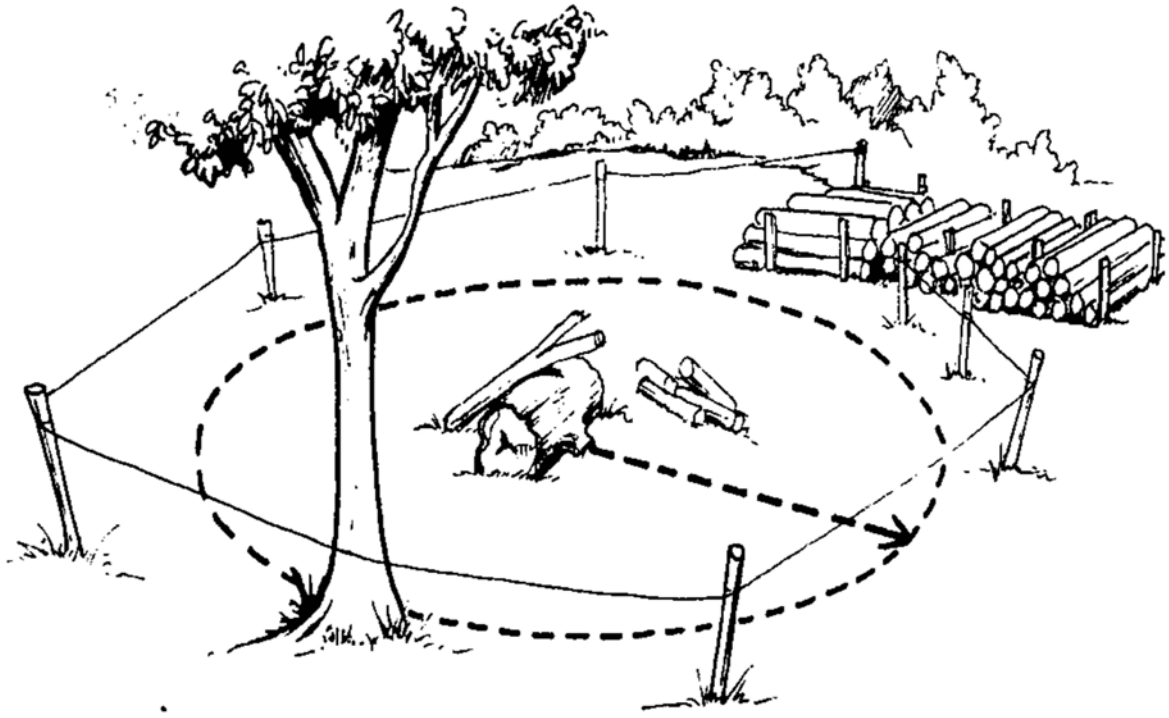
1. Explain and demonstrate how to cut wood using tools while the cadets observe.
2. Explain and demonstrate each step required to complete the skill. Monitor the cadets as they imitate each step.
3. Monitor the cadets' performance as they practice the complete skill.

Note: Assistant instructors may be used to monitor the cadets' performance.

SAFE WOOD CUTTING CONSIDERATIONS

The following considerations must be observed when cutting wood during a survival exercise:

- To prevent the tool from being snared in clothing do not wear scarves, ties, lanyards or any loose clothing.
- Wear strong leather boots, rather than running or soft shoes.
- Clear the ground nearby and make sure there are no overhanging branches, ropes, people or other obstructions within three axe lengths (that is one outstretched arm and the length of three axes).
- Never ask anyone to hold the wood that is being cut.
- Inspect the axe before use. Never use it if the head and handle do not line up straight, if the handle is split, chipped or otherwise damaged or broken or if the head is loose.
- Never use a blunt axe; it can slip or bounce off wood yet can still penetrate flesh.
- Whenever possible use a chopping block below the wood to be chopped and do not let the axe go into the ground.
- Chop directly over the chopping block. The part to be cut should be resting on the block.
- Always stop when feeling tired, because there is a greater chance of missing and causing a serious injury.
- Always use an axe within a marked out chopping area. Do not take an axe to the source of wood; bring the wood to the axe. A bow saw is a safer tool to use away from the chopping area.
- The chopping area is out of bounds for anyone not properly clothed or trained.



Scoutingresources.org/camping, Copyright 2007 by Scouting Resources. Retrieved November 19, 2007, from http://www.scoutingresources.org.uk/camping_axe.html

Figure 2-7-14 Chopping Area

USING AN AXE

On a Chopping Block

Demonstrate, explain and have each cadet practice chopping wood on a block with an axe.

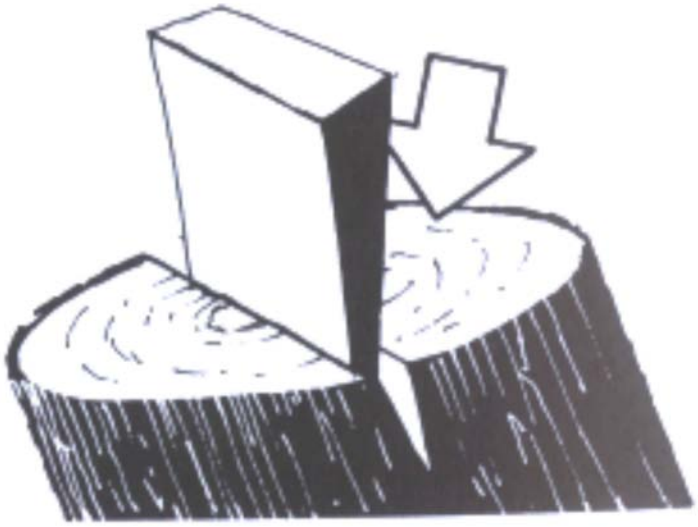
Before starting to use an axe, ensure that there is no one in the chopping area.

1. Crouch (or kneel on one knee) behind the chopping block.
2. Hold the wood to be chopped with one hand.
3. With the other hand grip the hand-axe on the lower part of the handle, on the ’grip’. Hold the axe firmly but not rigidly.
4. Gently tap the head of the axe into the wood until it is wedged and the wood sticks to the axe.
5. Stand up.
6. Grasp the axe with both hands and raise it 50–60 cm above the chopping block.
7. Bring the axe and the piece of wood down onto the chopping block with force.

If the axe is sharp the wood should easily split away. If the wood does not easily fall away the axe requires sharpening.

8. Repeat this process until the wood is halved.
9. Continue chopping the wood down to the desired size.

To split larger logs, use a wedge and a mallet (as illustrated in Figure 2-7-15).



J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 306)

Figure 2-7-15 Wedge

The two-handed overhead swing is not effective. It uses too much energy and can easily cause injury. One missed contact with the wood can easily result in losing a leg.

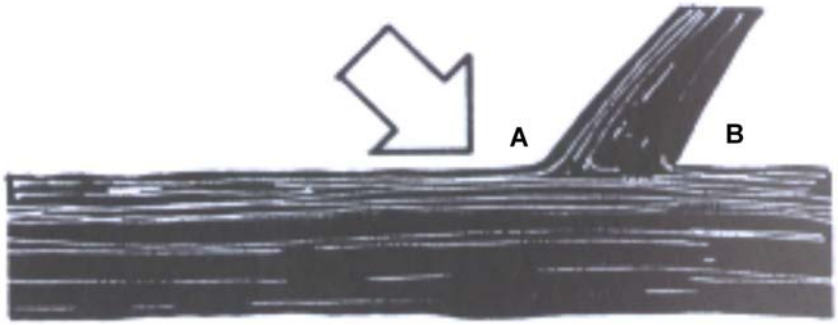
Cutting Logs

Demonstrate, explain and have each cadet practice cutting a log with an axe.

Before starting to use an axe, ensure that there is no one in the chopping area.

1. Stand with the legs far apart to avoid any glancing blows.

2. To remove branches chop on the outside of the fork (as illustrated in Figure 2-7-16). Make sure to stand on the other side of the log to prevent injury (as illustrated in Figure 2-7-17).



J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 306)

Figure 2-7-16 Removing Branches 1

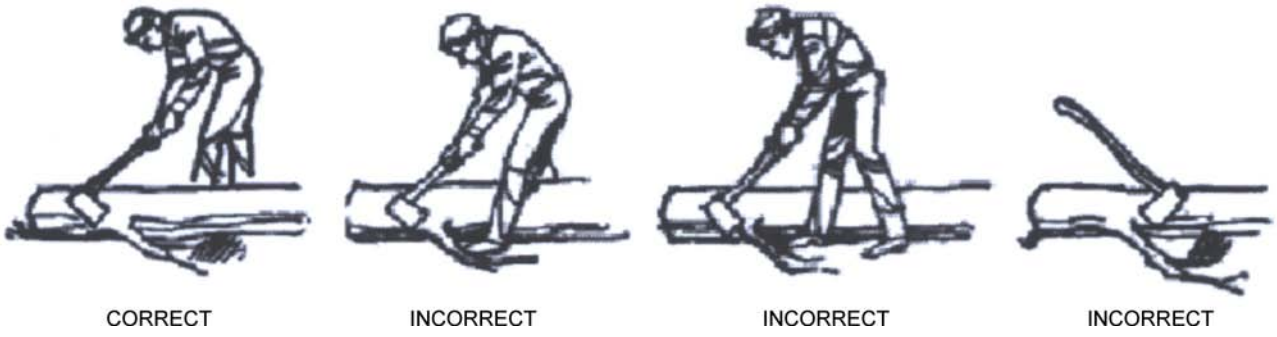


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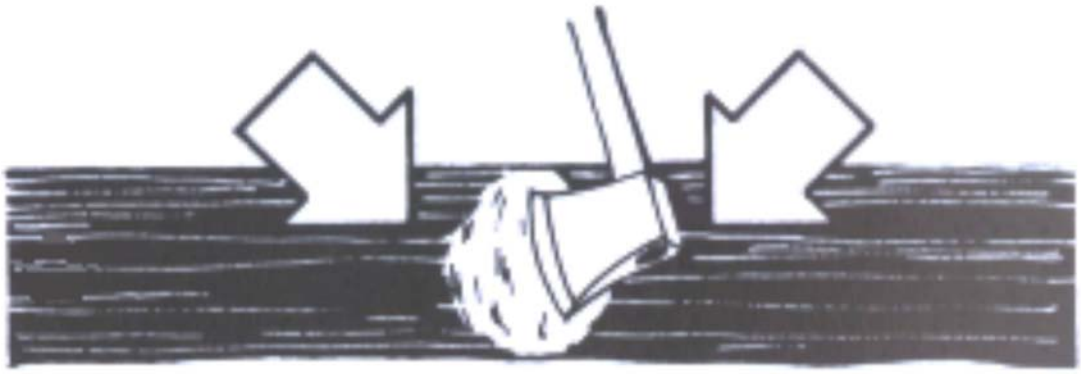
Figure 2-7-17 Removing Branches 2

3. Chop the wood by keeping the axe and the lower part of the arm straight and bending the arm at the elbow rather than the wrist or shoulder.

4. Chop at 45-degree angles to the length of the wood, making alternate left and right cuts to create a small 'V' (as illustrated in Figure 2-7-18). The 'V' will get wider as the axe cuts through the wood, creating the chippings, until it is cut in half. Do not try to cut at right angles to the length of the wood. This will make the axe bounce.



J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 306)

Figure 2-7-18 Log Chopping 1

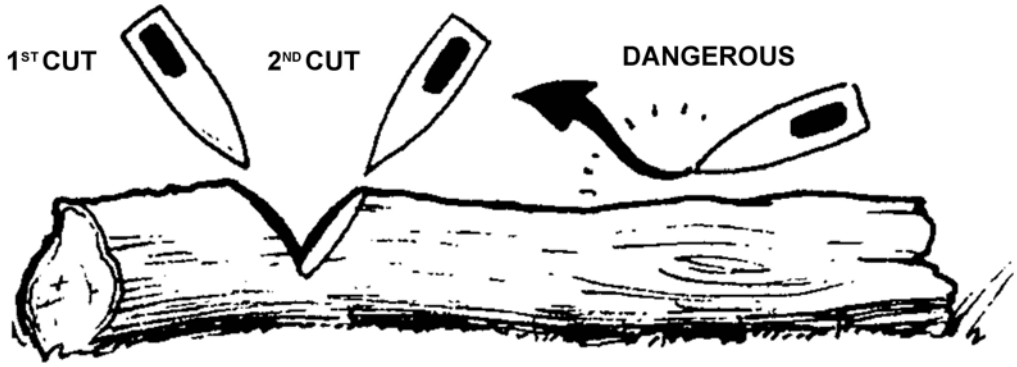


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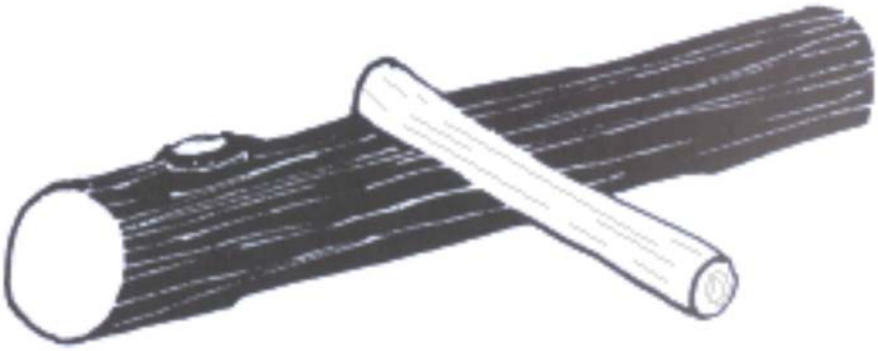
Figure 2-7-19 Log Chopping 2

Always watch the point at which you are aiming. When practicing it is a good idea to put a chalk mark on the log and try to hit it.

5. After each swing make sure to look around and check for people close by.
6. Clear chippings away regularly and use them for kindling.

Smaller logs should be leaned against larger logs (as illustrated in Figure 2-7-20). Do not use feet to stabilize.



J. Wiseman, The SAS Survival Handbook, HarperCollins Publishers (p. 306)

Figure 2-7-20 Chopping Area

USING A BOW SAW

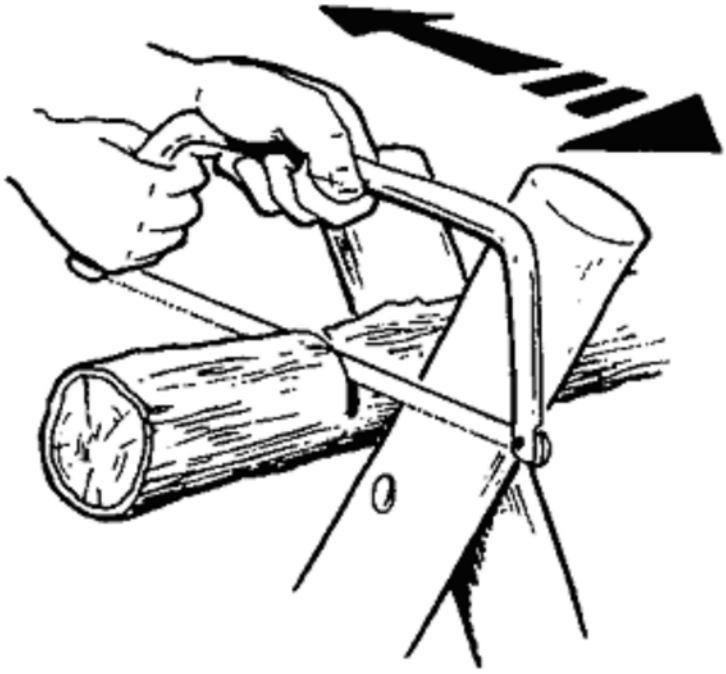
Demonstrate, explain and have each cadet practice cutting a log with a bow saw.

Before beginning, ensure that there is no one in the immediate area.

The cadets will observe the following principles when using a bow saw:

- Always use two hands on the saw.
- Ensure that the wood is held firmly.
- If a hand must be used to hold the wood; keep it well away from the blade.
- A technique is to place the stabilizing hand through the saw and grip the wood on the other side.
- Slowly pull the blade backward until the blade is well into the wood. Then push and pull in a steady rhythm using the whole length of the blade.
- For best results, place the log onto a stand or over a larger log. This will prevent the log from biting down onto the blade while cutting (as illustrated in Figure 2-7-21).

Always mask the saw after each use by using either a plastic 'clip-on' mask or tie a length of sacking around the blade. Never leave an open bow saw blade unattended.



scoutingresources.org/camping, Copyright 2007 by Scouting Resources. Retrieved November 19, 2007, from http://www.scoutingresources.org.uk/camping_axe.html

Figure 2-7-21 Cutting with a Bow Saw

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in using an axe to chop wood on a chopping block and in cutting logs using an axe and a bow saw will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in handling, passing, storing and cutting wood will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

It is important for the cadets to be able to use tools on a survival training exercise. Tools support survival training by assisting in setting up a field exercise, erecting tents, starting fires. The cadets need to know how to safely use and care for tools to prevent accidents.

INSTRUCTOR NOTES/REMARKS

N/A.

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ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 8

EO S292.08 – OPERATE A STOVE AND A LANTERN

Total Time:	80 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Most of the class will be presented at learning stations. Each learning station will require an instructor. The cadets will be divided into four groups after TP 2, sent to one of the four learning stations, then rotate through the four learning stations at 15 minute intervals. After the cadets have completed all four learning stations, they will reform into one group for the lesson's conclusion.

Learning stations are used for TPs 3–6. They are a form of group work, where the cadets will be learning by demonstration and performance. When setting up learning stations, ensure that there is enough room for each cadet to be comfortable, and adequate space to work with the equipment. When cadets arrive at a learning station, all materials shall already be available. These stations should be placed closely together to minimize time for movement; however far enough apart to avoid interruptions from other groups. For this lesson, four learning stations, one for each TP (3–6), shall be set up.

This lesson requires eight stoves and eight lanterns to run efficiently (two stoves and two lanterns for TPs 3 and 6, four stoves for TP 4, and four lanterns for TP 5. Less equipment may require more time in order to allow all cadets to participate.

The lesson has been designed using the common features of naphtha fuelled two-burner stoves and dual-mantle lanterns. Consult the operating manuals of the equipment to be used, and if necessary, modify the TPs accordingly.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TPs 1 and 2 as it allows the instructor to cover the material where the cadet can participate by asking or responding to questions and commenting on the material.

Demonstration and performance was chosen for TPs 3–6 as it allows the instructor to discuss the subject matter, demonstrate procedures and observe the cadets practicing and performing the skill.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have operated and a stove and a lantern.

IMPORTANCE

It is important for cadets to safely operate and maintain the stoves and lanterns most commonly used during field training. While on field training, a base of operations is required to support survival training.

Teaching Point 1 **Identify the Characteristics of a Two-Burner Stove**

Time: 5 min Method: Interactive Lecture

CHARACTERISTICS

The following are characteristics of a two-burner stove:

- It is capable of operating with a clean, smokeless flame.
- The flame can be quickly extinguished.
- It is easily ignited in cold weather.
- It is easy to refuel.
- It has no noxious odours.
- Fuel in the tank will not spill when being carried in any position.
- It cools quickly.
- It is easily cleaned and repaired.

Operational Temperature

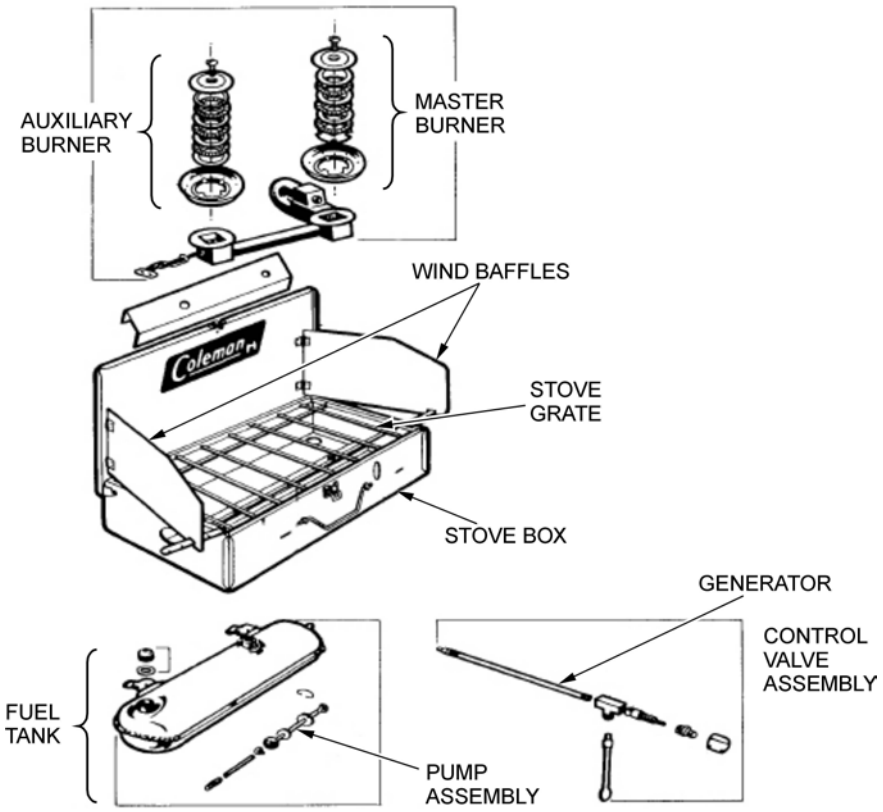
A two-burner stove (that uses naphtha as a fuel), when shielded from the wind, can be used in temperatures as low as -52 C.

Fuel Type

The stove uses naphtha. (Note: also known as white gas, camping fuel and Coleman fuel.)

Parts and Accessories

The following diagram is provided for part identification, not disassembly purposes.



B-GG-302-002/FP-001, Basic Cold Weather Training, Arctic and Sub Arctic Operations (Vol. 2) (p. 2-75)

Figure 2-8-1 Parts of the Coleman Two-Burner Stove

Stove Box. This is the container in which the burners are mounted. The fuel tank and generator assembly are also stored here when the stove is disassembled for storage.

Control Valve Assembly. This consists of the main valve wheel, auxiliary value, nut and body. Its function is to regulate the flow of pressurized fuel from the fuel tank through the generator to the burner head. It remains attached to the fuel tank.

Main Burner. The main burner head is located on the right (or left, depending on make/model) of the stove and consists of a burner cap and a small screw with a series of burner rings. The entire assembly sits in a large burner bowl. The main burner control knob is located on the valve and generator assembly.

Auxiliary Burner. The auxiliary burner head is located on the left (or right, depending on make/model) of the stove and consists of a burner cap and small screw along with a series of small burner rings. The entire assembly sits in a small burner bowl. The auxiliary burner control valve is located on the left (right) side of the stove box.

Pump Assembly. The pump assembly is fitted into the tank and is held in place by a pump cap clip.

Fuel Tank. The fuel tank is red in colour. The tank fits on the front of the stove box when in use.

Wind Baffles. The wind baffles shelter the burners from the wind.

Stove Grate. The stove grate supports cookware.

Generator. The generator supplies fuel to the burners. Fuel passing through the generator is heated by the main burner.

Precautions

Hazards are few if precautions are taken. Follow these simple rules:

- Never leave a lit stove unattended.
- Do not use a stove as a heating device or in an enclosed space.
- Never remove the fuel tank or loosen the filler cap on the fuel tank while the stove is in operation.
- Always fill and light the stove outside in a well ventilated area, away from open flame, heat and combustibles.
- Use only naphtha fuel.
- Store away from open flame or excessive heat.
- Always ensure wind baffles and lid supports are securely positioned before lighting the stove.
- Before transporting or storing, ensure the stove is cool. Loosen the filler cap to release the air pressure and retighten. Turn the control knob off. Ensure pump value is closed.
- If the stove catches fire, turn off the fuel supply, close the wind baffles and drop the stove lid.
- When removing the fuel tank to be refilled, remember that the generator gets HOT when the stove is operated. Allow the generator to cool before refilling the fuel tank.
- When using the stove ensure that a fire extinguisher is readily available.

It is important to stress to cadets that stoves and lanterns should not be used in enclosed spaces such as buildings and tents unless they are well ventilated. The burning of naphtha results in the release of carbon monoxide. Carbon monoxide is heavier than air, it therefore pools in the bottoms of buildings and tents, where cadets usually sleep. It will not dissipate, even for days, unless it is forced out by a strong, persistent, direct draft of cold air at floor/ ground level. Carbon monoxide can kill.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. What type of fuel is used?

Q2. What is the purpose of the generator?

Q3. Why should you only operate a stove in a well ventilated place?

ANTICIPATED ANSWERS

A1. Naphtha. (Note: also known as white gas, camping fuel and Coleman fuel.)

A2. The generator supplies fuel to the burners. Fuel passing through the generator is heated by the main burner.

A3. The burning of naphtha results in the release of carbon monoxide. Carbon monoxide is heavier than air, it therefore pools in the bottoms of buildings and tents, where cadets usually sleep. It will not dissipate, even for days, unless it is forced out by a strong, persistent, direct draft of cold air at floor/ground level. Carbon monoxide can kill.

Teaching Point 2 **Identify the Characteristics of a Dual-mantle Lantern**

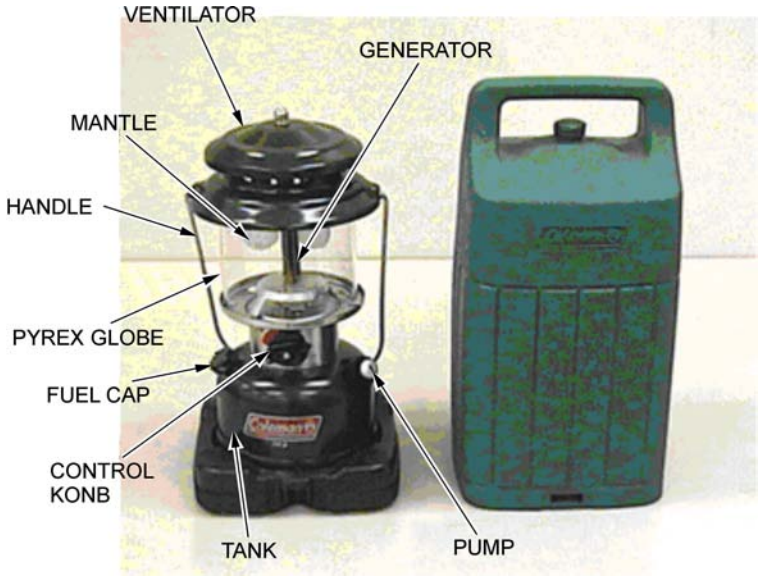
Time: 5 min Method: Interactive Lecture

CHARACTERISTICS

Dual-mantle lanterns are designed to burn naphtha. This fuel is pressurized in a tank attached to the unit, heated in a generator and then burned as a gas.

A lit lantern produces heat. Flammable materials should be kept a minimum of 60 cm above and 30 cm from all sides of the lantern.

Parts and Accessories



D Cdts 3, 2007, Ottawa, ON: Department of National Defence

Figure 2-8-2 Coleman Dual-Mantle Lantern

Generator. Provides pressurized fuel to the mantle.

Ventilator. Allows for heat and exhaust to evacuate the lantern.

Mantle. Emits a bright light by the burning naphtha fuel.

Handle. Allows the user to carry or hang the lantern.

Pyrex Globe. Protects the mantle from foreign debris. The globe also reduces the amount of oxygen entering the lantern.

Fuel Cap. Seals the fuel tank.

Control Knob. Controls the amount of fuel entering the generator, controlling the brightness of the lantern.

Tank. Is a fuel storage reservoir.

Pump. Pumps air into the fuel tank, pressurizing the tank.

Precautions

Hazards are few when precautions are taken. The following simple rules should be used:

- Never leave a lit lantern unattended.
- Do not use a lantern as a heating device or in an enclosed space.
- Never loosen the filler cap on the fuel tank while the lantern is in operation.
- Always fill and light the lantern outside in a well ventilated area, away from open flame, heat and combustibles.
- Use only naphtha fuel.
- Store away from open flame or excessive heat.
- If the lantern catches fire, turn off the fuel supply and let the excess fuel burn off.
- When using the lantern ensure that a fire extinguisher is readily available.
- The ventilator is HOT when lantern is lit.
- If hung by the handle while the lantern is lit, the handle is HOT.
- Mantles should be regularly checked for holes (replace if found).

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. What does the mantle do?

Q2. What does the pump on the lantern do?

Q3. When a lit lantern is hung, what should you keep in mind about the handle?

ANTICIPATED ANSWERS

A1. It emits a bright light by the burning naphtha fuel.

A2. It pumps air into the fuel tank, pressurizing the tank.

A3. If hung by the handle while the lantern is lit, the handle is HOT.

The flight should now be divided into four groups and each group sent to one of the four learning stations. Cadets at each learning station should work in pairs.

Teaching Point 3 **Explain, Demonstrate and Have the Cadets Fill and Drain a Stove and a Lantern**

Time: 15 min Method: Demonstration and Performance

For this learning station, it is recommended that instruction use the following format:

1. Explain and have the cadets examine the Environmental Spill Kit.
2. Explain the use of a drip pan for filling and draining.
3. Explain and demonstrate the steps for filling and draining a stove and a lantern while cadets observe.
4. Explain and demonstrate each step required to fill/drain a stove/lantern, having the cadets imitate each step.
5. Monitor the cadets' performance as they practice.

Note: Assistant instructors may be employed to monitor cadet performance. The cadets should work in pairs.

Stoves and lanterns must be cool to the touch before filling or draining.

Filling a Stove

The steps to fill a two-burner stove tank are as follows:

1. Ensure main valve wheel is closed.
2. Close pump knob firmly.
3. Remove fuel cap.
4. Insert funnel.
5. Ensure fuel tank is level.
6. Fill with clean, fresh fuel until the level reaches the bottom of the fill hole.
7. Remove funnel, ensuring any spills/overflow fall into the drip pan.
8. Replace fuel cap.

Filling a Lantern

The steps to fill a dual-mantle lantern are as follows:

1. Ensure control valve is closed.
2. Close pump knob firmly.
3. Remove fuel cap.
4. Insert funnel.

5. Ensure lantern is level.
6. Fill with clean, fresh fuel until the level reaches the bottom of the fill hole.
7. Remove funnel, ensuring any spills/overflow fall into the drip pan.
8. Replace fuel cap.

Draining a Stove

The steps to drain a two-burner stove tank are as follows:

1. Ensure main valve wheel is closed.
2. Close pump knob firmly.
3. Remove fuel cap.
4. Instruct funnel into fuel storage container.
5. Slowly and carefully pour fuel from tank into the funnel, ensuring any spills/overflow fall into the drip pan.
6. Replace fuel cap.

Draining a Lantern

The steps to drain a dual-mantle lantern are as follows:

1. Ensure control valve is closed.
2. Close pump knob firmly.
3. Remove fuel cap.
4. Instruct funnel into fuel storage container.
5. Slowly and carefully pour fuel from lantern into the funnel, ensuring any spills/overflow fall into the drip pan.
6. Replace fuel cap.

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in filling and draining a stove and a lantern will serve as the confirmation of this TP.

Send the group to their next learning station (only for the first three groups). If this is the last group, send group back to where TPs 1 and 2 were instructed.

Teaching Point 4 **Explain, Demonstrate and Have the Cadets Operate a Two-Burner Stove**

Time: 15 min Method: Demonstration and Performance

For this learning station, it is recommended that instruction take the following format:

1. Explain and demonstrate the steps while cadets observe.
2. Explain and demonstrate each step required to operate a two-burner stove, having the cadets imitate each step.
3. Monitor the cadets' performance as they practice.

Note: Assistant instructors may be employed to monitor cadet performance. The cadets should work in pairs.

ASSEMBLING

To assemble a two burner stove:

1. Unlatch and open the stove (as per Figure 2-8-3).
2. Open and secure the wind baffles (as per Figure 2-8-4).
3. Lift the grate and remove the fuel tank (as per Figure 2-8-5).
4. Install the fuel tank. Ensure the generator passes through the large hole in the front of the stove and is inserted into the opening in the mixing chamber above the burner. Insert hanger brackets on the tank into the slots located on the front of the stove case (as per Figure 2-8-5).
5. Secure the safety chain (as per Figure 2-8-6).
6. Close the grate (as per Figure 2-8-7).
7. Ensure the auxiliary burner valve is in the closed position (as per Figure 2-8-8).

D Cdts 3, 2007, Ottawa, ON: Department of National Defence

Figure 2-8-3 Closed Stove

D Cdts 3, 2007, Ottawa, ON: Department of National Defence

Figure 2-8-4 Wind Baffles

D Cdts 3, 2007, Ottawa, ON: Department of National Defence

Figure 2-8-5 Installing the Fuel Tank

D Cdts 3, 2007, Ottawa, ON: Department of National Defence

Figure 2-8-6 Securing the Safety Chain

D Cdts 3, 2007, Ottawa, ON: Department of National Defence

Figure 2-8-7 Closed Grate

D Cdts 3, 2007, Ottawa, ON: Department of National Defence

Figure 2-8-8 Auxiliary Burner Control

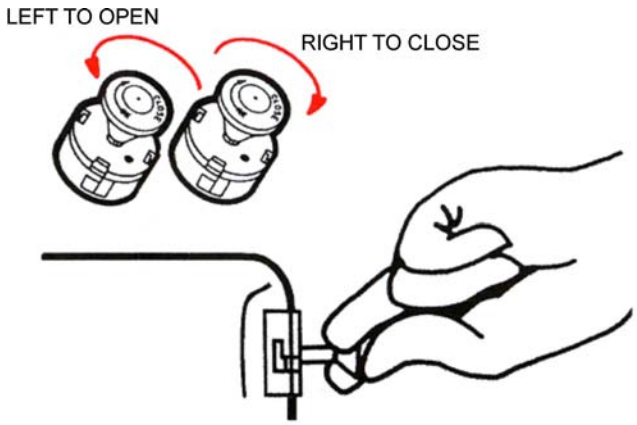
LIGHTING AND EXTINGUISHING A TWO-BURNER STOVE

The stove fuel tank should have been fuelled previous to this lesson; however, it should not be pressurized.

Pumping the Fuel Tank

1. Make sure the control knob is in the OFF position.

2. Turn the pump rod two full turns counter-clock wise (as per Figure 2-8-9).
3. Place the thumb over the air vent of the pump rod handle (as per Figure 2-8-9).
4. Pump 30 to 40 full strokes to pressurize the fuel tank.
5. Turn the pump rod clockwise until it is closed tight (as per Figure 2-8-9).



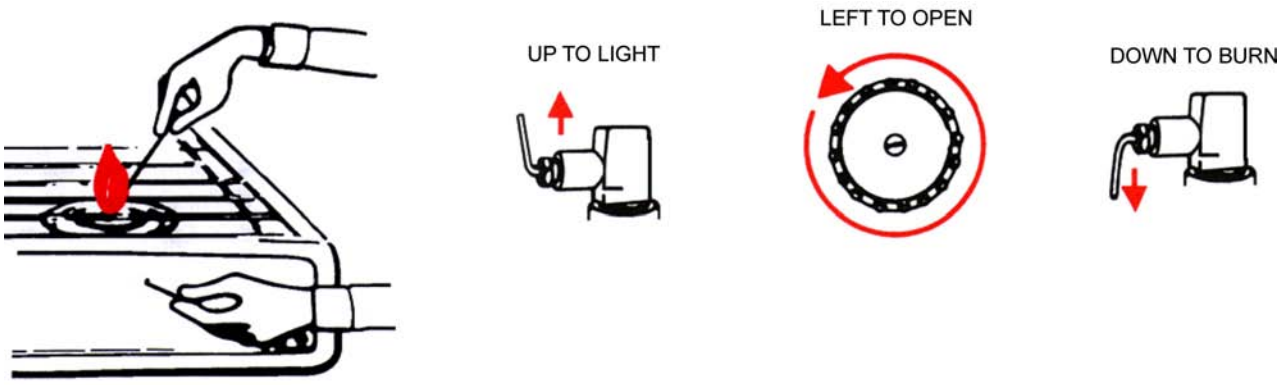
Coleman Camp Stove Model M425F710C, Instructions for use, by The Canadian Coleman Co., Mississauga, ON

Figure 2-8-9 Pumping the Fuel Tank

Lighting the Main Burner

During colder conditions, it may be necessary to warm the generator prior to lighting. This can be accomplished by applying a small amount of fuel to the main burner directly and lighting it with a match. The burning fuel will heat the generator, heating the fuel inside and facilitating the lighting of the burner. When the generator is not adequately heated it is possible for liquid fuel to pool in the stove which is very dangerous.

1. Ensure the auxiliary valve is in the closed position and the tank is pumped.
2. Do not lean over the stove while lighting.
3. Hold a lit match near the master burner (as per Figure 2-8-10).
4. Turn the instant light lever to the UP TO LIGHT position (as per Figure 2-8-10).
5. Turn the main valve control knob to the LIGHT position or setting.
6. Monitor the flame.
7. When the flame turns blue in colour (approximately one minute), turn the instant light lever to the DOWN TO BURN position and turn the control knob to the desired heat setting (HI – LO).



Coleman Camp Stove Model M425F710C, Instructions for use, by The Canadian Coleman Co., Mississauga, ON

Figure 2-8-10 Lighting the Main Burner

Should the stove fail to light or the match goes out before ignition, turn the control knob to the OFF position and wait two minutes before attempting to light the stove again.

Lighting the Auxiliary Burner

1. After the main burner has been lit, the auxiliary burner may be lit.
2. Hold a match to the auxiliary burner. Open the auxiliary valve located on the side of the stove box, next to the burner (the main burner may require adjustment after lighting the auxiliary burner).

Extinguishing the Burner

1. Close the auxiliary burner valve.
2. Remove cookware from the stove and turn the instant light lever up to LIGHT position and let burn for one minute. This cleans heavier parts of fuel from the generator.
3. Turn the main valve control knob clockwise to the OFF position and close firmly.

A small flame on the main burner will continue to burn for a few minutes, until the fuel empties from the generator.

DISASSEMBLING A TWO-BURNER STOVE AFTER USE

To store a two-burner stove:

1. Allow the stove to cool before packing.
2. Ensure the stove is clean and any dirt, matches, etc. are emptied from the stove box.
3. Ensure the auxiliary burner valve is in the closed position.
4. Open the grate.
5. Remove the safety chain.

6. Uninstall the fuel tank and remove it from the stove box.
7. Unpressurize the fuel tank by loosening the filler cap, then retighten it to reseal the fuel tank. Note: Angle the fuel tank so that the filler cap is highest to reduce possible fuel leakage.
8. Place the fuel tank inside the stove box.
9. Close the grate.
10. Close and fold in the wind baffles.
11. Close the cover and latch the box.

CONFIRMATION OF TEACHING POINT 4

The cadets' participation in operating a stove will serve as the confirmation of this TP.

Send the group to their next learning station (only for the first three groups). Ensure all fuel tanks are not pressurized for the next group. If this is the last group, send group back to where TPs 1 and 2 were instructed.

Teaching Point 5 **Explain, Demonstrate and Have the Cadets Operate a Dual-Mantle Lantern**

Time: 15 min Method: Demonstration and Performance

For this learning station, it is recommended that instruction take the following format:

1. Explain and demonstrate the steps while cadets observe.
2. Explain and demonstrate each step required to operate a dual-mantle lantern. Monitor cadets as they imitate each step.
3. Monitor the cadets' performance as they practice.

Note: Assistant instructors may be employed to monitor cadet performance. The cadets should work in pairs.

ASSEMBLING

The lantern does not require assembly or disassembly except when replacing the mantles/globe. Before operating the lantern, the cadet should verify that the handle is in place and that the ball nut (screw on top of the ventilator) is tight.

LIGHTING AND EXTINGUISHING A DUAL-MANTLE LANTERN

The lantern should have been fuelled previous to this lesson; however, the lantern should not be pressurized. When a mantle is replaced it should be burned prior to use. By burning the mantle, the mantle shrinks down in size ensuring that combustion of the fuel takes place at the mantle. When the mantle is not burned prior to use fuel can leak out of the mantle prior to combustion.

Pumping the Fuel Tank

1. Make sure the control knob is in the OFF position.
2. Turn the pump rod two full turns counter-clockwise.
3. Place the thumb over the air vent of the pump rod handle.
4. Pump 30 to 40 full strokes to pressurize the fuel tank.
5. Turn the pump rod to clockwise until it is closed tight.

Lighting the Lantern

Do not position the hands or head above the lantern when lighting.

Mantles are very fragile and shall be avoided when using a match to light the lantern.

1. Insert a lit match through the hole in the bottom of the burner frame.
2. Turn the control knob to the LIGHT position.
3. When the mantle burns bright white (after about one minute), turn the control knob to the ON position.
4. Add more air pressure to the tank. Air pressure may be added while the lantern is in operation. Good air pressure is important for maximum light output.

Extinguishing the Lantern

1. Turn the control knob to the OFF position.
2. Allow the remaining fuel to burn off.

STORING THE LANTERN AFTER USE

To store a dual-mantle lantern:

1. Ensure the lantern is cool.
2. Wipe and clean away any dirt.
3. Drain the fuel into a fuel storage container (do not drain as the lantern is required for the other groups to use).
4. Place in a cool, dry location.

CONFIRMATION OF TEACHING POINT 5

The cadets' participation in operating a lantern will serve as the confirmation of this TP.

Send the group to their next learning station (only for the first three groups). Ensure all fuel tanks are not pressurized for the next group. If this is the last group, send group back to where TPs 1 and 2 were instructed.

Teaching Point 6 **Explain, Demonstrate and Have the Cadets Perform Minor Maintenance**

Time: 15 min Method: Demonstration and Performance

This learning station should begin with a discussion about cleaning before the cadets replace a mantle and examine the pump assembly.

1. Explain and demonstrate the steps to replace a mantle while cadets observe.
2. Explain and demonstrate each step required to replace a mantle. Monitor cadets as they imitate each step.
3. Explain and demonstrate the steps to examine the pump assembly while cadets observe.
4. Explain and demonstrate each step required to examine the pump assembly. Monitor cadets as they imitate each step.
5. Monitor the cadets' performance as they practice.

Note: Assistant instructors may be employed to monitor cadet performance. The cadets should work in pairs.

The cadets will only discuss cleaning. The cadets should work in pairs.

PERFORM MINOR MAINTENANCE

Stoves and lanterns must be cool to the touch before performing cleaning and any minor maintenance.

Cleaning the Stove

Clean as needed during a field exercise and before storage.

- Fuel tank should be wiped using fresh naphtha as the solvent.
- The burner assemblies should have the remains of matches and food residue (Note: Flame usually burns yellow instead of blue where there are remains and residue).
- Stove box should be washed with soap and water to remove food residue and grease.

The burner assemblies should not be immersed in water as any water left in the tubes will cut-off or restrict the flow of fuel. Burner assemblies should be removed from the stove box and cleaned separately if the stove box is being immersed to be cleaned.

Cleaning the Lantern

Clean as needed during a field exercise and before storage.

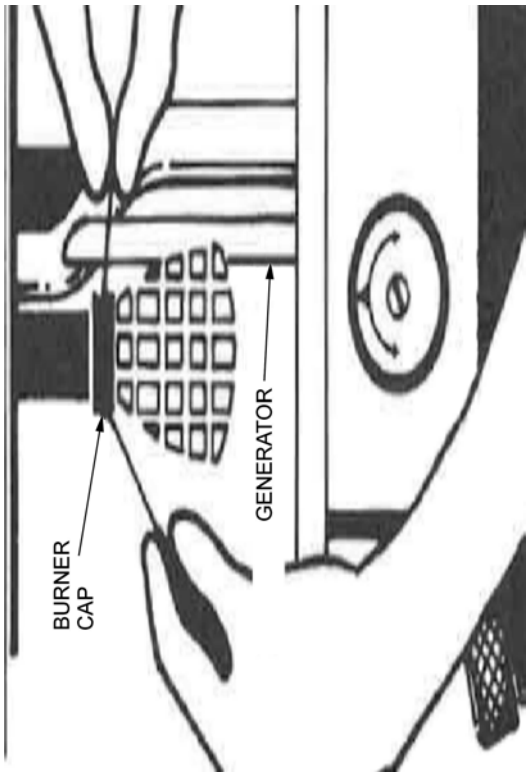
- Fuel tank and ventilator should be wiped using fresh naphtha as the solvent.
- Remains of matches should be removed from inside the globe.

- Globe should be carefully cleaned and dried.

Replacing a Mantle

If a mantle has fallen apart or has a hole in it, it should be replaced before operating the lantern.

1. Remove handle by pulling the handle arms gently away from the lantern.
2. Unscrew and remove the ball nut.
3. Remove the ventilator.
4. Remove the globe.
5. Only use the appropriate mantle for the lantern.
6. Remove the remains of the old mantle.
7. Tie mantle around the groves in the burner cap, with the flat side of the mantle facing the generator (as per Figure 2-8-11).
8. Cut off excess string.
9. Light bottom of the mantle evenly, burning until nothing but ash is left.
10. Allow mantle to cool before lighting the lantern.
11. Reassemble the lantern.

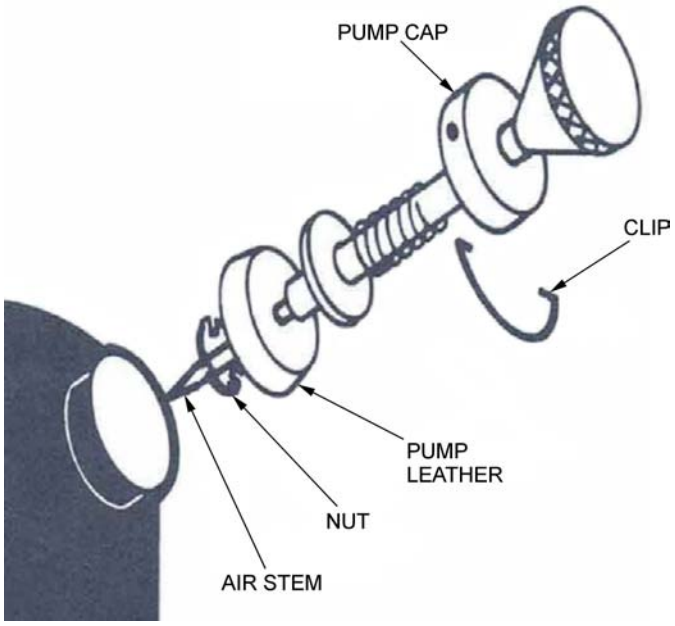


Coleman Lantern Model 220K195 & 228K195, How To Use and Enjoy, by The Canadian Coleman Co., Toronto, ON

Figure 2-8-11 Replacing a Mantle

Examining the Pump Assembly

1. Remove clip from pump cap using needle-nose pliers (as per Figure 2-8-12).
2. Turn pump knob counter clockwise several times to unscrew air stem.
3. Pull out pump and air stem (as per Figure 2-8-12).
4. Examine pump leather, if dry, work several drops of oil into it.
5. Insert pump and air stem into tank (pump leather must not invert or fold).
6. Replace pump cap and clip.
7. Turn pump knob clockwise several times to screw air stem into the tank.



Coleman Lantern Model 220K195 & 228K195, How To Use and Enjoy, by The Canadian Coleman Co., Toronto, ON

Figure 2-8-12 Pump Assembly

CONFIRMATION OF TEACHING POINT 6

The cadets' participation in performing minor maintenance will serve as the confirmation of this TP.

Send the group to their next learning station (only for the first three groups). If this is the last group, send group back to where TPs 1 and 2 were instructed.

END OF LESSON CONFIRMATION

The cadets' filling and draining, operating and performing minor maintenance on a two-burner stove and a dual-mantle lantern will serve as confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

Knowing how to operate a stove and a lantern will give the cadets the skills needed to help support survival training during field exercises.

INSTRUCTOR NOTES/REMARKS

Have all instructors running the learning stations emphasize safety is all aspects of their TP.

The Environmental Spill Kit will be at the fuelling area.

Refer to manuals for the stove and lantern for all operations and maintenance.

TPs 3–6 are set up to allow the lesson to be taught by dividing the flight into four groups and rotating through each TP site at 15 minute intervals.

A fire extinguisher will be at each site where stoves and lanterns are being lit.

REFERENCES

Manuals for stove and lanterns types being used.

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ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 9

EO S292.09 – COMMUNICATE WITH A HAND-HELD RADIO

Total Time:	80 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Radios presented in this lesson are the Talkabout FRS/GMRS Recreational Two-Way Radios Models T5000, T5500, and T5550. Models may vary in each CSTC. Refer to the user's guide and modify the lesson as required.

Check the hand-held radios to ensure they operate. If rechargeable batteries are used, they should all be checked prior to the lesson and recharged if necessary. If regular batteries are being used, provide enough spares to replace all batteries if required.

Photocopy the sample message worksheet for each cadet located at Annex F.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

Demonstration and performance was chosen for TPs 1 and 6 as it allows the instructor to explain and demonstrate the skill the cadet is expected to acquire while providing an opportunity for the cadet to practice the skill under supervision.

An interactive lecture was chosen for TPs 2–5 to review previous material from PL1 and 2, and to present new basic material and procedures.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have communicated with a hand-held radio.

IMPORTANCE

It is important for the cadets to know how to communicate with a hand-held radio during survival exercises where groups are commonly training in separate areas.

Teaching Point 1 **Review How to Operate a Hand-Held Radio**

Time: 20 min Method: Demonstration and Performance

The cadets should be divided into groups based on the number of hand-held radios available (a minimum of one radio for every four cadets).

The radios should be distributed at this time.

As this TP is a review, do not spend a lot of time on any one point. Have the cadets identify or perform as required.

PARTS OF THE RADIO AND THEIR FUNCTION

Accessory Jack. The accessory jack is located on the right side of the radio and is used to plug in accessories such as a hands-free microphone or headset (as illustrated in Figure 2-9-1).

Antenna. The antenna is located on the top of the radio and transmits and receives radio waves.

Battery Cover. The battery cover, which covers the batteries, is located on the back of the radio.

Battery Cover Latches. The battery cover latches are located at the top of the battery cover and is used to open the battery cover.

Light Emitting Diode (LED). The LED is on the front of the radio and will illuminate when the radio is turned on (as illustrated in Figure 2-9-1).

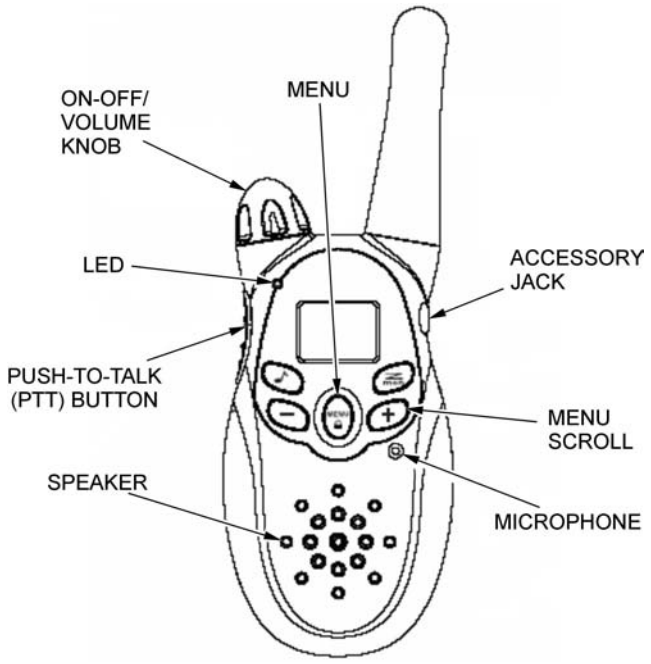
Menu Scroll/Channel/Frequency Selector. The menu scroll/channel/frequency selector is located on the front of the radio and is used to change channels or frequencies (as illustrated in Figure 2-9-1).

Microphone. The microphone is located on the front of the radio. The microphone converts sound into an electrical signal (as illustrated in Figure 2-9-1).

On-Off/Volume Knob. The on-off knob is located at the top left of the radio. It turns the radio on-off.

Push-to-Talk Button (PTT). The PTT button is on the left side of the radio and allows voice transmissions (as illustrated in Figure 2-9-1).

Speaker. The speaker is found on the front of the radio and converts electric current into audible sound (as illustrated in Figure 2-9-1).



Motorola, Inc., Talkabout FRS/GMRS Recreational Two-Way Radios Models T5000, T5500, T5550 User's Guide, Motorola, Inc. (p. 11)

Figure 2-9-1 Hand-Held Radio

The rest of the TP is demonstration and performance.

Turn the Radio On/Off

To turn the radio on, turn the on-off/volume knob clockwise. The radio will beep and the radio display will briefly show all feature icons of the radio.

To turn the radio off, turn the on-off/volume knob counter-clockwise. A clicking sound will indicate the radio is turned off.

Adjust Frequencies

The radio operates on a group of frequencies that are accessed through radio channels. To set the channel of the radio, push the menu button, this will cause the current channel to flash. Using the menu scroll button, scroll through the channels and push the PTT button to select the desired channel.

Operate the PTT Button

To send and receive messages, check the channel activity by pressing the PTT button. Static will be heard if the channel is clear to use. Do not transmit if someone is talking on the channel.

To operate the PTT button:

1. Depress the PTT button.
2. Observe a standard pause.

3. Speak loudly, clearly and briefly.
4. Release the button.

The LED will glow continuously when sending messages.

To listen to messages, release the PTT button.

Change Batteries

Explain to the cadets what type of battery is required to operate the hand-held radio. Consult the user's guide to ensure the proper size and type of battery is being used. The Talkabout radios discussed in this lesson uses either three AA batteries or a rechargeable battery pack.

Many hand-held radios will use three AA batteries for power. To insert or replace the batteries, follow these steps:

1. Remove the battery compartment cover.
2. Replace/install batteries (as illustrated in Figures 2-9-2 and 2-9-3).
3. Replace the battery compartment cover.
4. Safely discard spend batteries.

Motorola, Inc., Talkabout FRS/GMRS Recreational Two-Way Radios Models T5000, T5500, T5550 User's Guide, Motorola, Inc. (p. 13)

Figure 2-9-2 Batteries

Motorola, Inc., Talkabout FRS/GMRS Recreational Two-Way Radios Models T5000, T5500, T5550 User's Guide, Motorola, Inc. (p. 13)

Figure 2-9-3 Changing the Batteries

Batteries may corrode over time if left in radios and can cause permanent damage; therefore, they should be removed before storing radios for extended periods of time.

Batteries are not all the same and each have specific instructions for their proper disposal and/or recycling. Batteries are made of various materials comprised of heavy metals including nickel cadmium, alkaline, mercury, nickel metal hydride and lead acid. These elements can harm the environment if not properly discarded. As such, batteries are one of the most complex items to dispose of or recycle. The batteries most people use are household types; however, due to the variety of different rules and regulations, check with the local community recycling facility to determine the household battery recycling options or supporting unit/base POL/HAZMAT section.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in performing the various radio operations will serve as confirmation of this TP.

Teaching Point 2 **Review the Phonetic Alphabet and Numbers**

Time: 5 min Method: Interactive Lecture

As this TP is a review, do not spend a lot of time on any one point. Have the cadets recite the phonetic letters and numbers.

PHONETIC ALPHABET

The phonetic alphabet is used because letters that sound similar might be confusing when said over a radio. An example of similar sounding letters is 'M' and 'N'. Therefore, each letter of the alphabet is associated with a word that is easily understood over the radio.

The phonetic alphabet is as follows:

- A – Alfa,
- B – Bravo,
- C – Charlie,
- D – Delta,
- E – Echo,
- F – Foxtrot,
- G – Golf,
- H – Hotel,
- I – India,
- J – Juliet,
- K – Kilo,
- L – Lima,

- M – Mike,
- N – November,
- O – Oscar,
- P – Papa,
- Q – Quebec,
- R – Romeo,
- S – Sierra,
- T – Tango,
- U – Uniform,
- V – Victor,
- W – Whiskey,
- X – X-ray,
- Y – Yankee, and
- Z – Zulu.

PHONETIC NUMBERS

Phonetic numbers are used to avoid misunderstandings when using radio communication. Numbers are enunciated in the following manner:

- 0 – Zee-ro,
- 1 – Wun,
- 2 – Too,
- 3 – Tree,
- 4 – Fow-er,
- 5 – Fife,
- 6 – Six,
- 7 – Seven,
- 8 – Ait, and
- 9 – Nin-er.

Numbers are always spoken as single digits, except for whole thousands. For example, 5280 would be spoken “fife too ait zee-ro” and 5000 would be spoken “fife tou-sand.”

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. Which word is used to represent the letter “F”?

Q2. Which word is used to represent the letter “S”?

Q3. How is the number “9” enunciated?

ANTICIPATED ANSWERS

A1. Foxtrot.

A2. Sierra.

A3. Nin-er.

Teaching Point 3 **Identify Call Signs**

Time: 5 min Method: Interactive Lecture

CALL SIGNS

Call signs are used to identify and organize objects, positions and persons within a radio network. A call sign may take the form of a word, a pair of words or a combination of letters and figures. Call signs may also be identified as, “station” or “stations” within a radio network.

Objects

The best example of an object that uses a call sign is an aircraft. Aircraft, in an initial radio communication, give their make and model or the type of aircraft, followed by the four letters of their registration.

Examples: Piper Tomahawk Golf Mike Oscar Tango; Ultralight India Bravo Charlie Hotel.

Positions

Position call signs are used for a position, for example, a fire picket (eg, Fire Picket Alfa), where the position is constant but the personnel change. In this example, as different personnel work the fire picket, the call sign remains constant allowing for no confusion as to whom the radio message is for or from.

Persons

A person’s name is rarely used in radio communications. Call signs are created and then made known to all within the radio network. A common example is using a flight’s name to designate its commander (eg, Commander of Hornet Flight may have a call sign of Hornet or Hornet One).

CONFIRMATION OF TEACHING POINT 3

QUESTIONS

Q1. What would the call sign be for this aircraft: Cessna Model 172 with registration TNPM?

Q2. Why should you use a call sign for a position such as a fire picket?

Q3. What rarely should be used in radio communications?

ANTICIPATED ANSWERS

A1. Cessna Wun Seven Too Tango November Papa Mike.

A2. As different personnel work the position, the call sign remains constant allowing for no confusion as to whom the radio message is for or from.

A3. A person's name.

Teaching Point 4 **Discuss Good Radio Techniques**

Time: 10 min Method: Interactive Lecture

GOOD RADIO TECHNIQUES

Pronouncing Words Clearly

The act of speaking clearly is called enunciation. When sending a transmission via radio it is important to pronounce words clearly and concisely.

Speaking at a Moderate Pace

Speaking too fast may slur words while speaking too slow unnecessarily lengthens the transmission.

Keeping Voice Pitch Constant

High-pitched voices transmit better than low-pitched voices.

Not Shouting

When using a radio, shouting is considered to be poor radio etiquette and can garble the message. Also, shouting over the radio will not make the radio's signal stronger and may be heard over other radios that are transmitting.

Knowing What You Will Say Before You Speak

When making transmissions, each message should be as short as possible and should not exceed 10 seconds in length. To reduce the possibility of confusion while transmitting, subject matter should be kept to one topic. Transmit only what is needed. If necessary, draft the message before transmitting. In addition, refrain from using slang terms.

Not Using Profanity or Offensive Language

Avoid the use of profane, indecent or obscene language. The way that one talks on the air is guided by national and international standards. These standards are termed voice procedure. Voice procedure is intended to maximize clarity and reduce misunderstanding in spoken communication.

Not Beginning a Call Until Other Calls are Ended

Before transmitting, wait for a period long enough so as not to interfere with transmissions already in progress. Only one radio on a given frequency should transmit at a time. If more than one radio is transmitting at the same time, the radio with the strongest signal of the two will be heard. This becomes very important if there is an emergency call as the message may be transmitted over by another radio.

Not Breaking into a Conversation Unless it is an Emergency

Breaking into a conversation is when a caller joins a conversation in progress. Three-way conversations can become very confusing when using two-way radios. It is better to wait for the first conversation to end and then calling one (or both, one at a time) of the parties involved.

It is important to note that there are occasions when more than two call signs are involved. One example is when conducting a radio check, where call signs reply, usually in the order they are listed on the network. Another example is when information is sent to several call signs at once and only an acknowledgement is required. In both these examples it is usually someone in authority who initiates the call.

Emergency calls take priority. All other calls are on hold until the end of the emergency. If a caller has declared an emergency, stop transmitting and wait until the emergency is finished before resuming.

CONFIRMATION OF TEACHING POINT 4

QUESTIONS

Q1. What does enunciation mean?

Q2. Why should a person avoid using profane, indecent or obscene language over the radio?

Q3. Which type of call has the highest priority?

ANTICIPATED ANSWERS

A1. The act of speaking clearly.

A2. The way that one talks on the air is guided by national and international standards. These standards are termed “voice procedure”. Voice procedure is intended to maximize clarity and reduce misunderstanding in spoken communication.

A3. Emergency calls. All other calls should stop transmitting and wait until the emergency is finished before resuming.

Teaching Point 5 **Identify Standard Phrases**

Time: 10 min Method: Interactive Lecture

Standard phrases are recommended in the interest of clarity and brevity (clear and short). Use of standard phrases provides uniformity in transmission; it makes transmissions more readily understood by others on the network and enables one to more easily understand the transmissions.

COMMON

The following list is not exhaustive and contains words and phrases the cadets are likely to experience.

Affirmative. Yes.

Disregard. Ignore my last message.

Go Ahead. Proceed with your message.

I Spell. I will spell the word. Normally used for important/technical words.

Negative. No.

Out. My transmission is ended and I do not expect a reply.

Over. My transmission is ended and I expect a reply.

Read Back. Repeat the message back after receiving the “over”. Used to confirm that instructions have been correctly received.

Roger. I have received your message.

Say Again. Repeat your last message. Used when a message has not been understood.

Stand By. I will continue my transmission in a few seconds.

EMERGENCY

Break-Break. This is used when there is time-critical emergency information that must be transmitted immediately. An example of this type of emergency would be advising all stations of an approaching hail storm.

Mayday. This word is repeated three times at the start of a message to declare an emergency. An example of this type of emergency would be for a person with an injury requiring immediate medical attention.

These emergency words and phrases should never be used unless the situation warrants it.

CONFIRMATION OF TEACHING POINT 5

QUESTIONS

Q1. Which word or phrase should be used to say “No”?

Q2. Which word or phrase should be used to say “Ignore my last message”?

Q3. Which emergency words or phrase should be used to advise everyone about an approaching storm?

ANTICIPATED ANSWERS

A1. Negative.

A2. Disregard.

A3. Break-break.

Teaching Point 6 **Have the Cadets Respond to and Initiate a Call**

Time: 20 min Method: Demonstration and Performance

This TP will begin with describing the sequence of a transmission and then responding to a radio check. Next, have the cadets create their own individual call sign to use for the exercise. The cadets should then be divided into pairs of groups who will use the same frequency. Each group should have one radio. For each assigned frequency there should be one supervisor with a radio to monitor the transmissions and to initiate a radio check.

Each frequency will require three radios, one for the supervisor and one for each group of four cadets. For example: a flight of 24 cadets would be divided into six groups. Each pair of groups would use the same frequency with one supervisor monitoring. These three pairs of groups would require nine radios and three different frequencies. Do not use frequencies already allocated to the CSTC radio network.

Distribute Sample Message Worksheet located at Annex F to each cadet.

TRANSMISSION SEQUENCE

When a call sign (also known as a station within a radio network) originates a call it must first avoid interfering with other radio transmissions. An operator shall listen to make certain that a frequency is clear before making any transmissions. Before conducting regular traffic over the radio it may be necessary to make contact with other call signs involved to ascertain that communication is possible.

Upon initiating a call, the transmission sequence is as follows:

1. The initiating call sign will transmit the call sign of the intended receiver followed by their own call sign with the phrase “THIS IS” between them (see Examples 1–2, Step 1) and finishing with the word “OVER”.
2. The receiving call sign will acknowledge the call by transmitting its call sign and finishing with the word “OVER” (see Examples 1–2, Step 2).
3. After a reply is received the initiating call sign will end the transmission. If nothing further is to be said, by transmitting its call sign or acknowledging the receipt of the answer with the word “ROGER” and concluding the message by ending with the word “OUT” (see Examples 1–2, Step 5).

Example 1 of a radio call:

1. Hornet One transmits: Spitfire Two – this is Hornet One – message – over.
2. Spitfire Two responds to the initial call transmitting: Spitfire Two – over.
3. Hornet One continues by transmitting: Spitfire Two – report your location – over.
4. Spitfire Two replies by transmitting: Spitfire Two – shelter site – over.
5. Hornet One concludes radio transmissions by transmitting: Hornet One – roger – out.

Example 2 of a radio call:

1. Hornet One transmits: Spitfire Two – this is Hornet One – message – over.
2. Spitfire Two responds to the initial call, transmitting: Spitfire Two – send message – over.

3. Hornet One continues with the message, transmitting: Hornet One – will reach your location in too-fife minutes – over.
4. Spitfire Two responds to the message, transmitting: Spitfire Two – roger – over.
5. Hornet One concludes the call by: Hornet One – out.

The caller that starts the transmission must end it.

RADIO CHECKS

A radio check is used to test the radios on the network for serviceability and signal strength. It also may be used to check that the radios are turned ON and on the assigned frequency (easily identifiable by the call signs that do not respond to the radio check).

As air cadets, the aviation radio communication readability and strength scales will be used.

Aviation Radio Communication Check Scales

Readability	Strength	Strength #
Perfectly readable	Excellent	5
Readable	Good	4
Readable with difficulty	Fair	3
Readable now and then	Poor	2
Unreadable	Bad	1

The scales are used to decide on a strength number based on the strength of the signal of the radio check. On hearing a radio check, the call signs, in the order as designated within the network, reply based on their readability of the transmission.

For example:

1. The squadron commander initiates a radio check: All stations – this is Cougar Major – radio check – over.
2. Since Hornet is listed before Spitfire, Hornet stations reply first (in order): Hornet One – strength 5 – over.
3. Hornet Two replies: Hornet Two – strength 4 – over.
4. Now that all Hornet stations have replied, Spitfire continues (in order): Spitfire One – strength 4 – over.
5. Spitfire Two replies: Spitfire Two – strength 3 – over.
6. The squadron commander, after receiving all replies, ends the radio check: Cougar Major – roger – out.

If there had been a problem, like a missing call sign, the squadron commander could call directly to those stations to determine the problem. If there is a missing reply, the next call sign should continue the radio check after a long pause (to give the missing station time to reply).

ACTIVITY

Time: 10 min

OBJECTIVE

The objective of this activity is to have the cadets communicate using a hand-held radio.

RESOURCES

- Hand-held radios (three per frequency),
- Batteries,
- Assigned network frequencies,
- Pen/pencil, and
- Sample Message Worksheet located at Annex F.

ACTIVITY LAYOUT

This activity works best in a field setting. It should be noted that two-way radios work better with at least a five-metre distance between callers. Radios transmitting too closely together usually produce interference and radio feedback.

ACTIVITY INSTRUCTIONS

1. Have the cadets create their own individual call sign (must be simple and easy to remember).
2. Divide the cadets into groups with one hand-held radio. Have the cadets pass the radio to other cadets in the group as required.
3. Assign each pair of groups the same radio frequency.
4. Have cadets inform their partner group of their call signs and vice versa.
5. Have each pair of groups move apart to at least a five-metre separation.
6. Have each supervisor do a radio check with their pair of groups.
7. Have cadets communicate to the cadets in their pair group. Ensure all cadets participate.

Allow the cadets to create messages. Remind them that they are being monitored by their supervisor and that anyone on that frequency can hear them (eg, the general public as these are public frequencies, not private ones). They may use the questions located on the Sample Message Worksheet located at Annex F.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 6

The cadets' participation in the radio communication activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in communicating with a hand-held radio will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

It is important for the cadets to know how to communicate with a hand-held radio during survival exercises where groups are commonly training in separate areas. The ability to communicate over distance allows separated groups to coordinate their activities. In addition, it allows for the rapid communication of information, especially in an emergency.

INSTRUCTOR NOTES/REMARKS

The instructor will be responsible for consulting the owner's manual for detailed instructions on radio operation.

Dispose of or recycle the batteries in accordance with local regulations.

REFERENCES

C0-069 Motorola Inc. (2004). *Talkabout FRS/GMRS Recreational Two-Way Radios Models T5000, T5500, T5550 User's Guide*. Motorola Inc.

C3-116 (ISBN 0-9680390-5-7) MacDonald, A.F., & Peppler, I.L. (2000). *From the Ground Up: Millennium Edition*. Ottawa, ON: Aviation Publishers Co. Limited.

C3-164 Mission Amateur Radio Emergency Services Society (n.d.). *Emergency Plan*. Retrieved October 11, 2007, from http://www.percs.bc.ca/Ops/Plans/Mission_Amateur_Radio_Emergency_Plan.pdf.

SAMPLE KIT LIST

Issued Clothing:

Combat boots,
Combat pants,
Combat shirts,
Grey shorts,
Grey socks,
Grey t-shirts,
Poncho/raingear,
Running shoes,
Sweatpants,
Sweatshirt, and
Tilley hat.

Issued Equipment:

Canteen,
Ground sheet,
Knife,
Laundry bag,
Notebook,
Pen/pencil,
Rucksack/backpack,
Sleeping bag,
Sleeping pad,
Valise,
Wash bassin, and
Whistle.

Personal Clothing:

Socks, and
Underwear.

Personal Equipment:

Hygiene kit.

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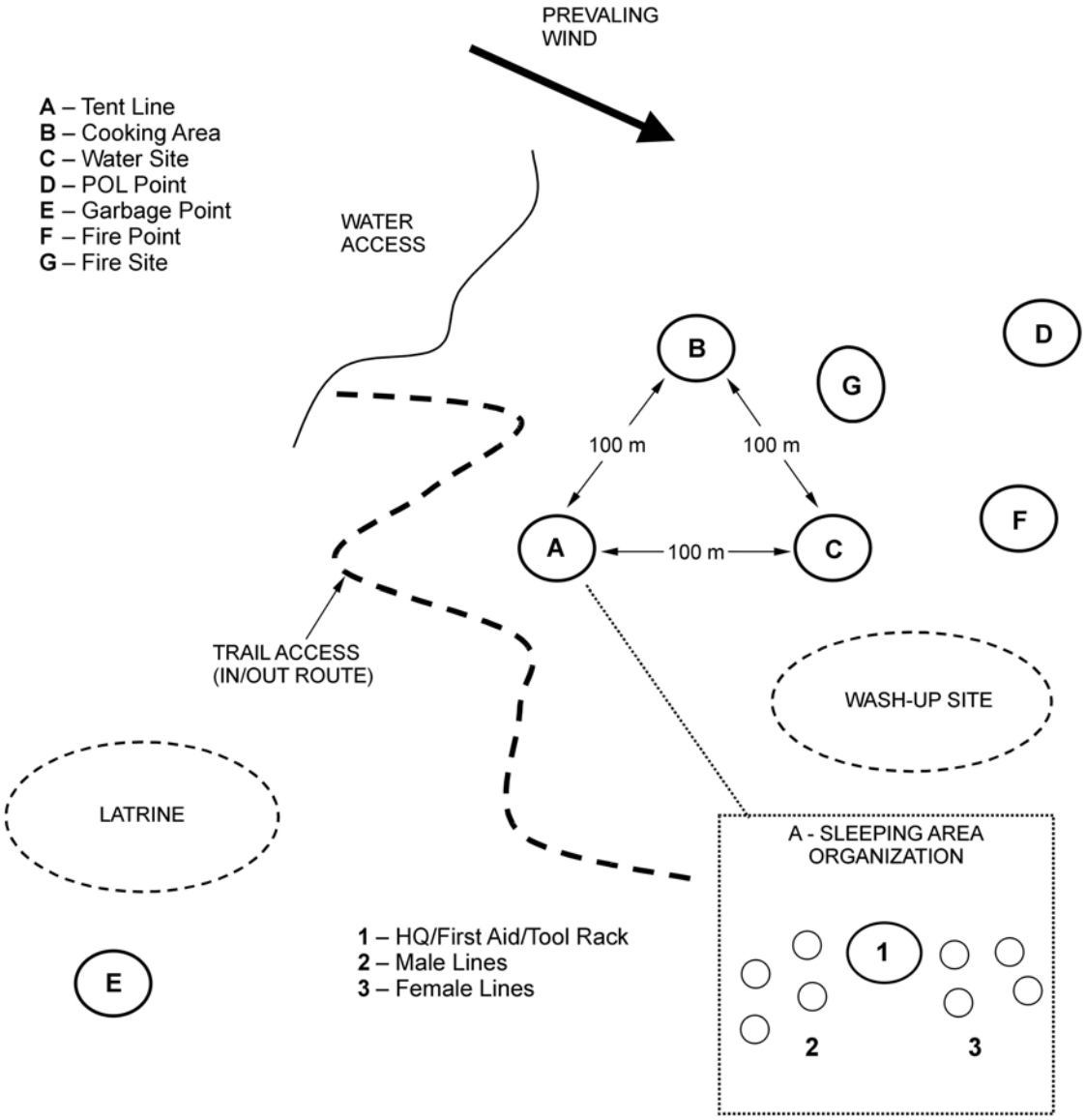
SAMPLE EXERCISE SITE



D Cdts 3, 2007, Ottawa, ON: Department of National Defence

Figure 2B-1 Sample Exercise Site

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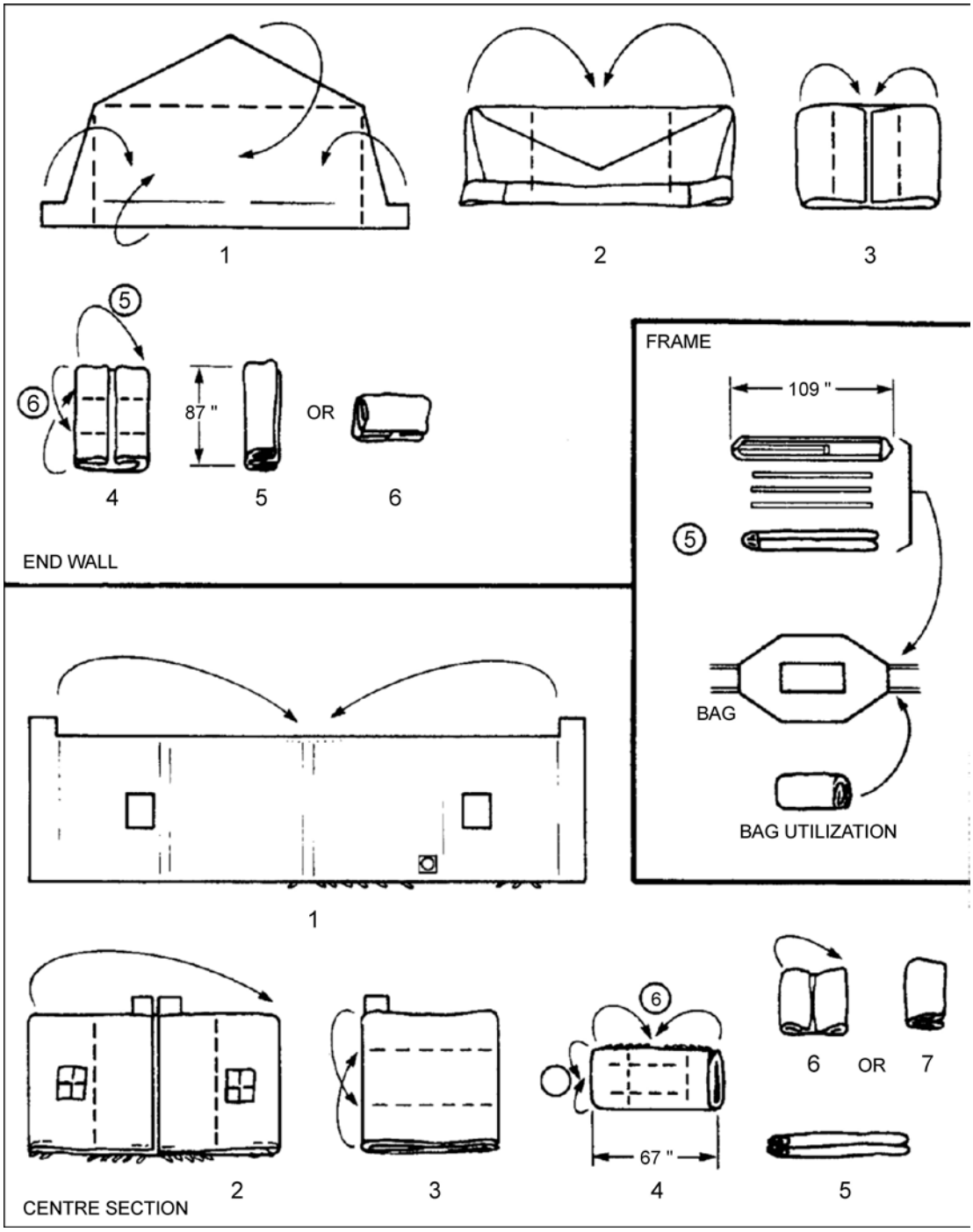
TENT PACKING PROCEDURE

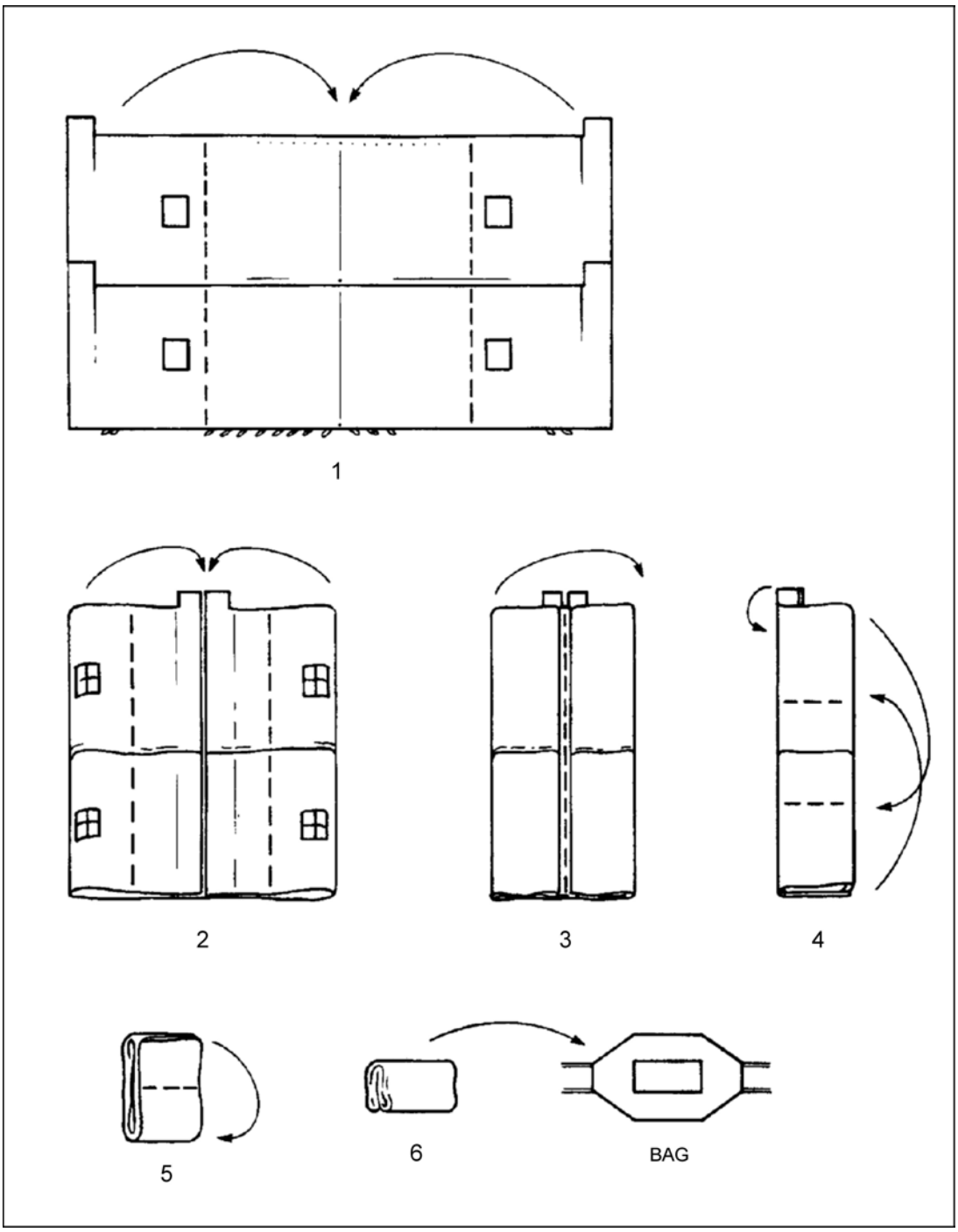
FOLDING A SINGLE TENT SECTION



C-87-110-000/MS-000 (p. 2-17)

Figure 2C-1 Folding a Single Tent Section

FOLDING LACED TENT SECTIONS

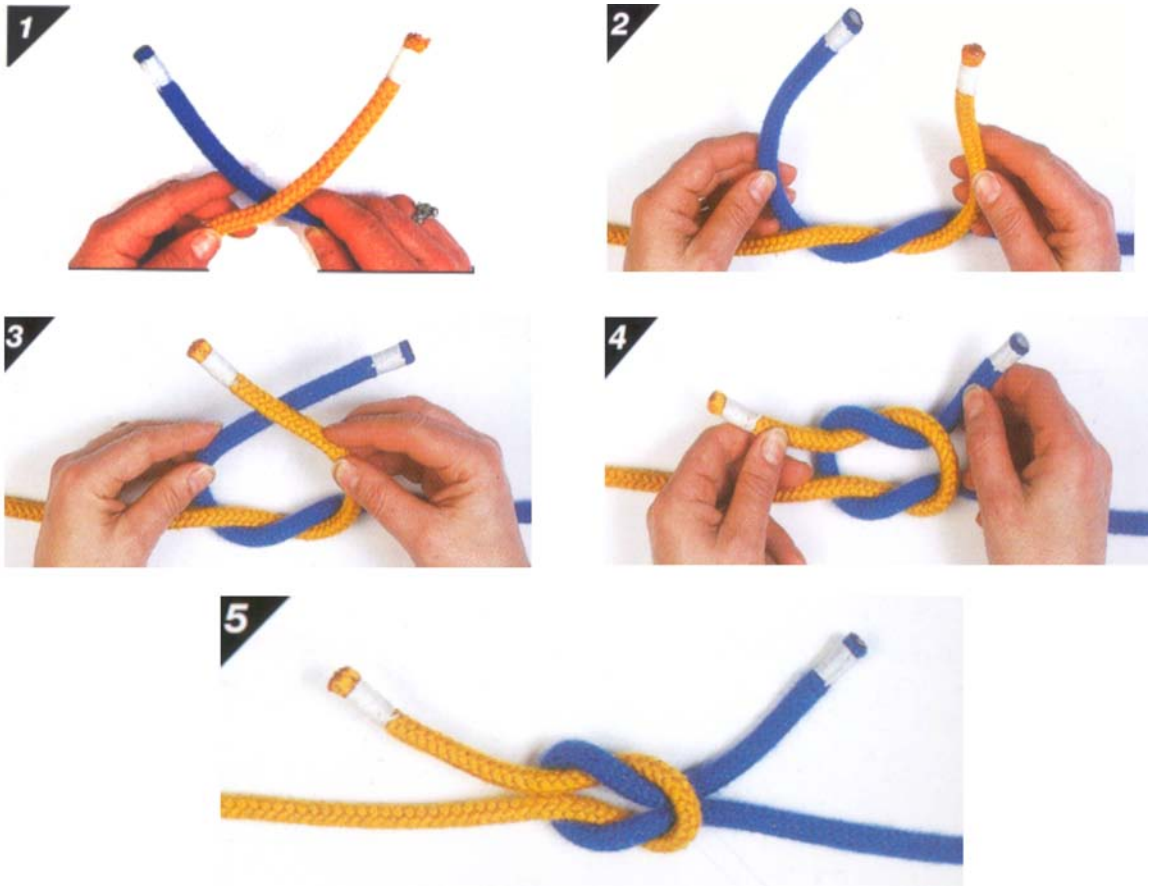


C-87-110-000/MS-000 (p. 2-18)

Figure 2C-2 Folding Laced Tent Sections

KNOT-TYING INSTRUCTIONS

REEF KNOT



D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd. (p. 98)

Figure 2D-1 Steps 1–5

1. Place the left hand working end on the top of the right hand working end.
2. Bring the left hand working end under the right hand working end.
3. Place the working end that is now on the right on top of the working end that is now on the left.
4. Bring the working end that is on top under the other working end so that working end that is moving comes out at the same place it entered the knot.
5. Pull tight to complete the reef knot.

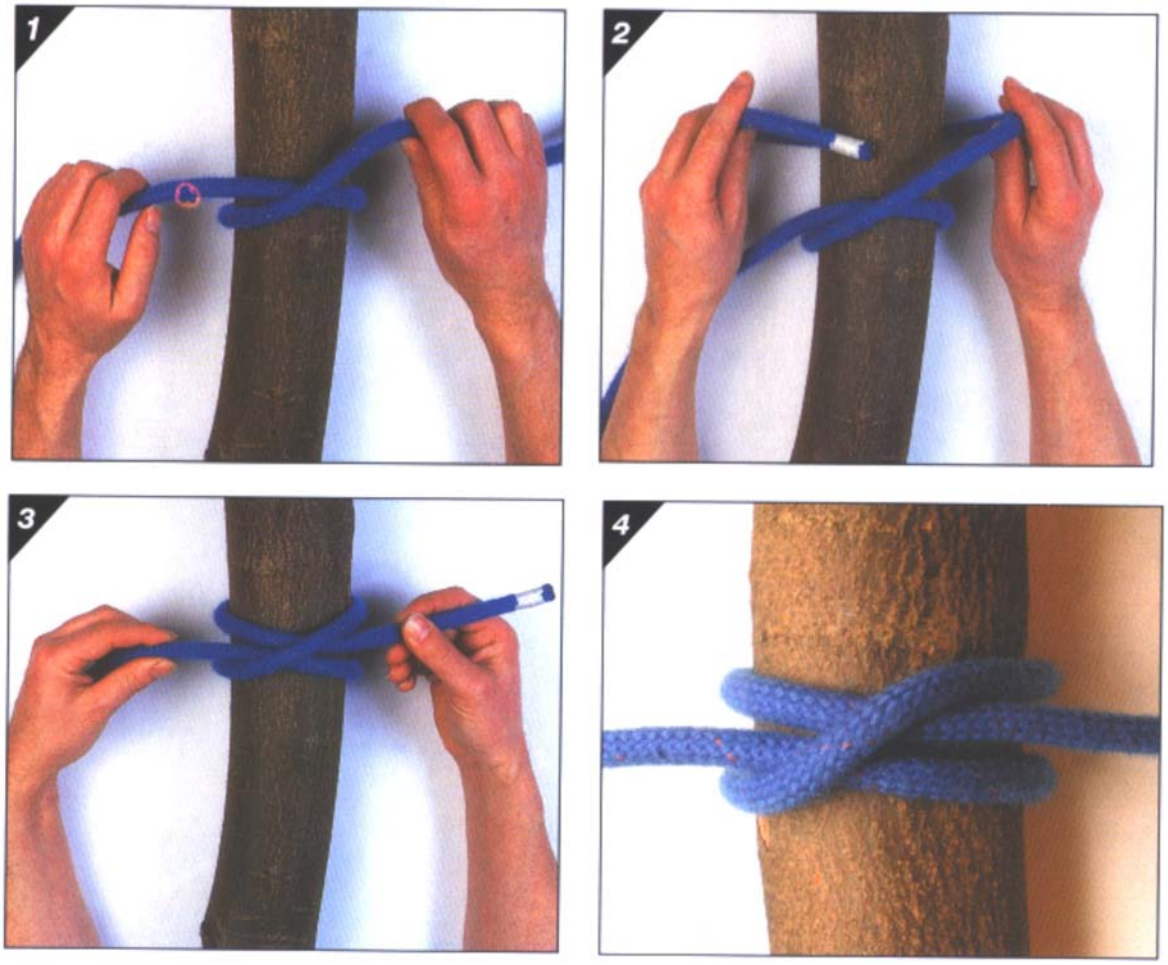
FIGURE-OF-EIGHT KNOT

D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd. (p. 44)

Figure 2D-2 Steps 1–3

1. Make a crossing turn with the working end passing under the standing part of the rope and then bring the working end over the standing part.
2. Now tuck the working end up through the loop from behind, forming a figure-of-eight.
3. Pull tight to complete the figure-of-eight knot.

CLOVE HITCH

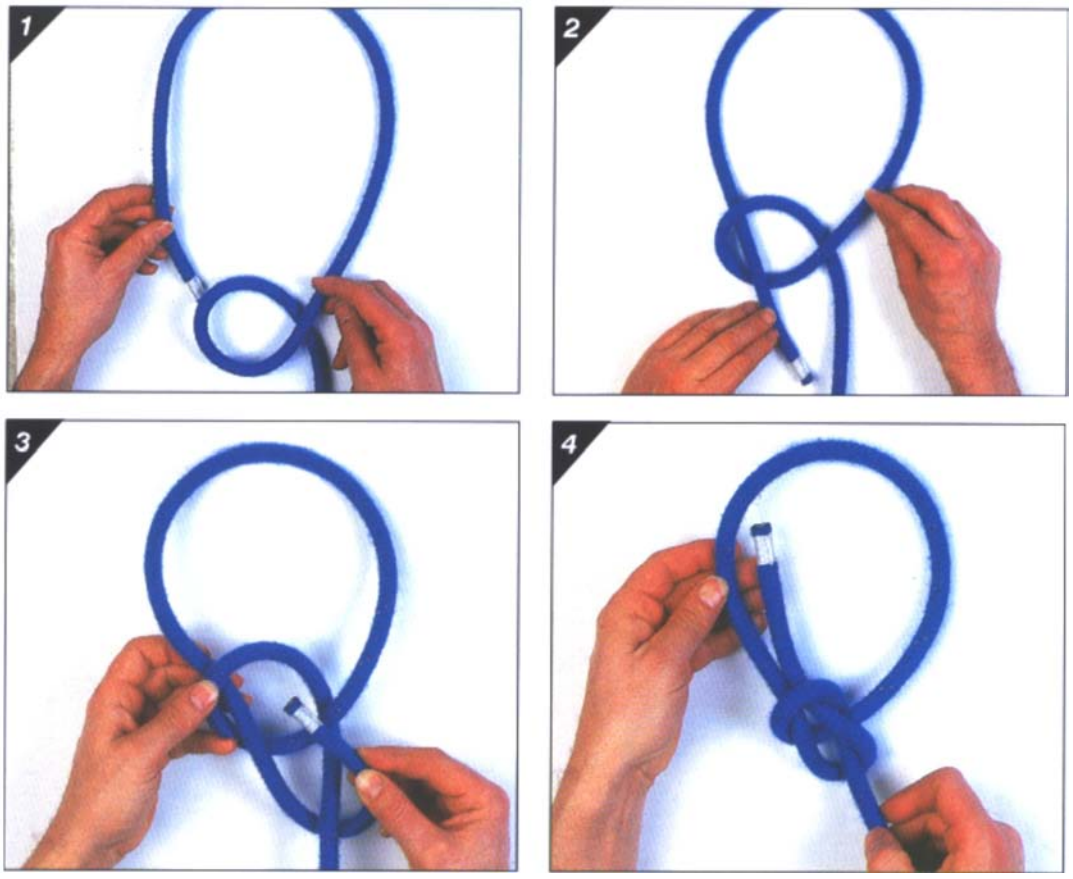


D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd. (p. 106)

Figure 2D-3 Steps 1–4

1. Make a turn around the pole/tree bringing the working end of the rope over and trapping the standing part of the rope. This makes the first half hitch.
2. Bring the working end round behind the pole/tree, above the first half hitch.
3. Put the working end under the turn just made. This gives the second half hitch and forms the clove hitch.
4. Pull tight to complete the clove hitch.

BOWLINE



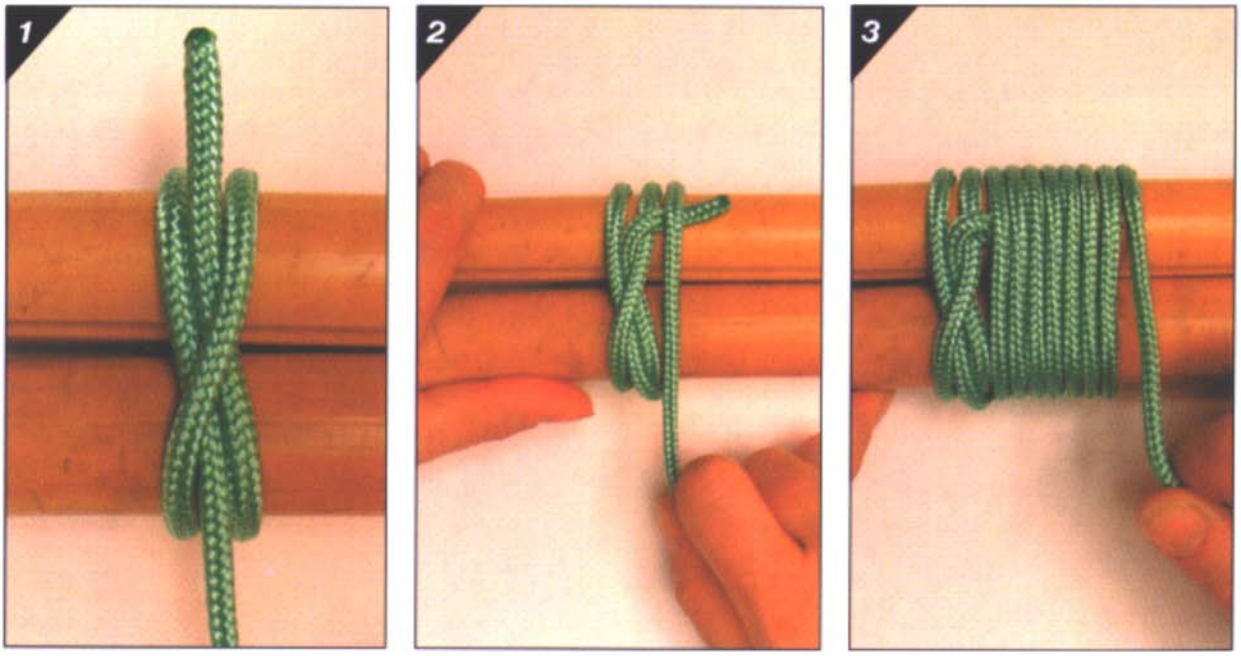
D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd. (p. 163)

Figure 2D-4 Steps 1–4

1. A short distance back from the working end, make a crossing turn with the working part on top. Go on to form the size of the loop you require.
2. Bring the working end up through the crossing turn. It will go under first, and then lie on top of the other part of the turn.
3. Bring the working end around behind the standing part and down through the crossing turn. A good way to remember this is: “the rabbit comes out of the hole, around the tree and back down the hole again”.
4. Pull tight by holding the working end and pulling on the standing part to complete the bowline.

LASHING INSTRUCTIONS

ROUND LASHING

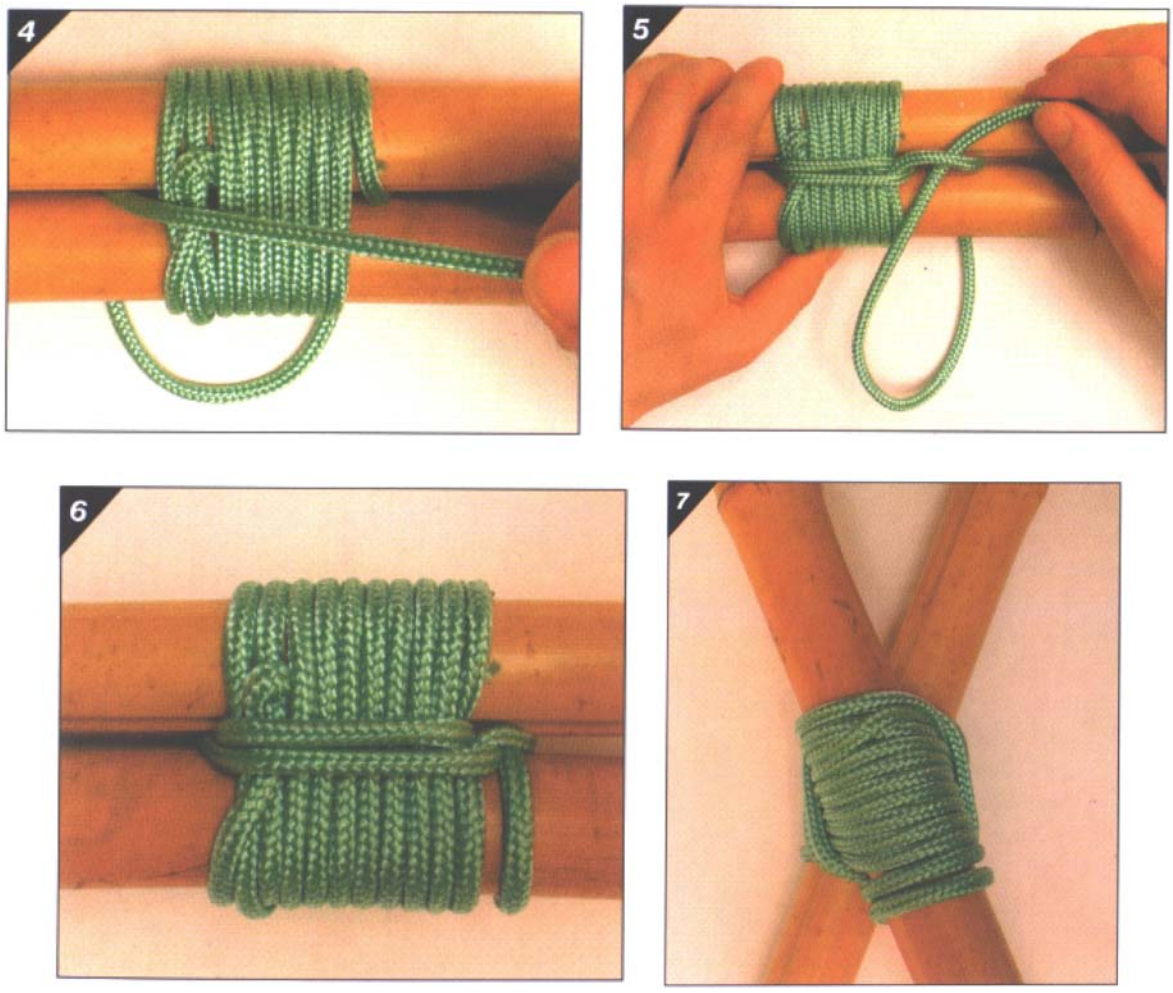


D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 184)

Figure 2E-1 Steps 1–3

1. Start by making a clove hitch around both poles.
2. Wrap around both poles, trapping the end of the clove hitch.
3. Carry on making eight to ten more turns round the pair of poles.

ROUND LASHING

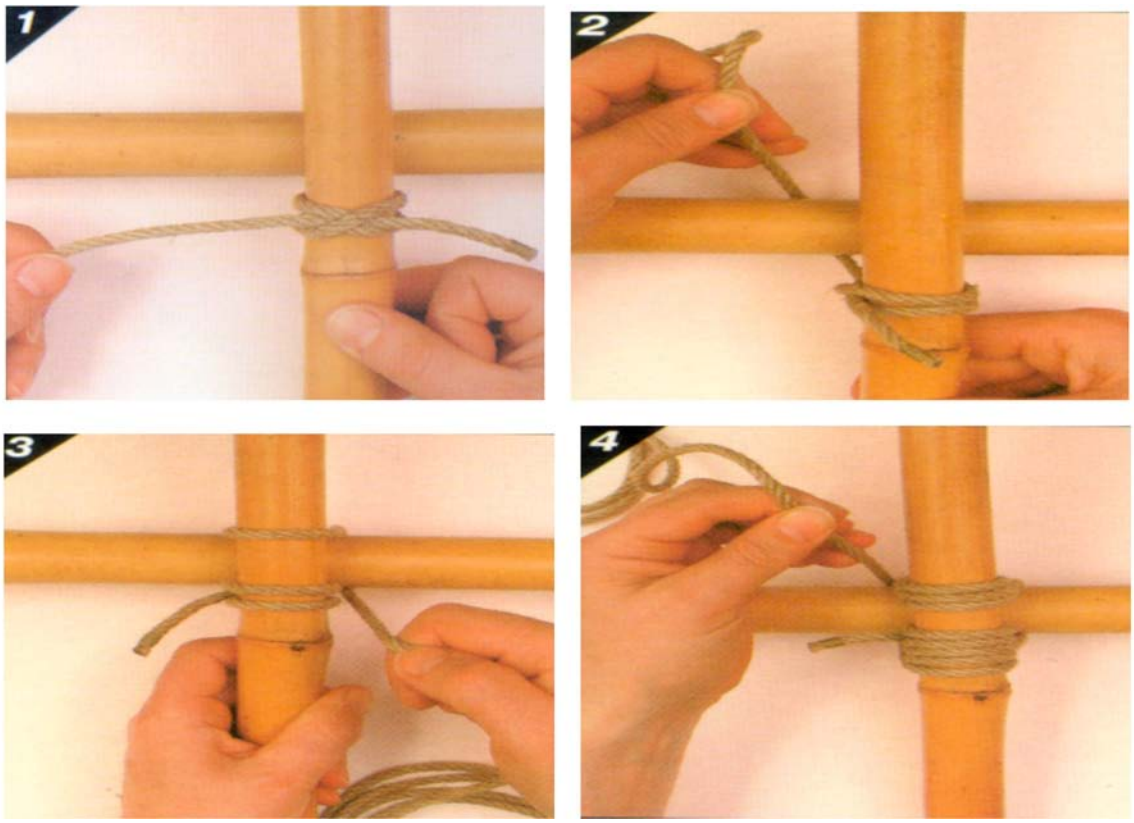


D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 185)

Figure 2E-2 Steps 4–7

4. The lashing could now be finished with a clove hitch around both poles or put in a couple of frapping turns by bringing the end of the rope between the two poles.
5. Finish off with a clove hitch around one of the poles.
6. Pull tight to finish the round lashing with the poles parallel.
7. If being used for an “A” frame then open the poles.

SQUARE LASHING

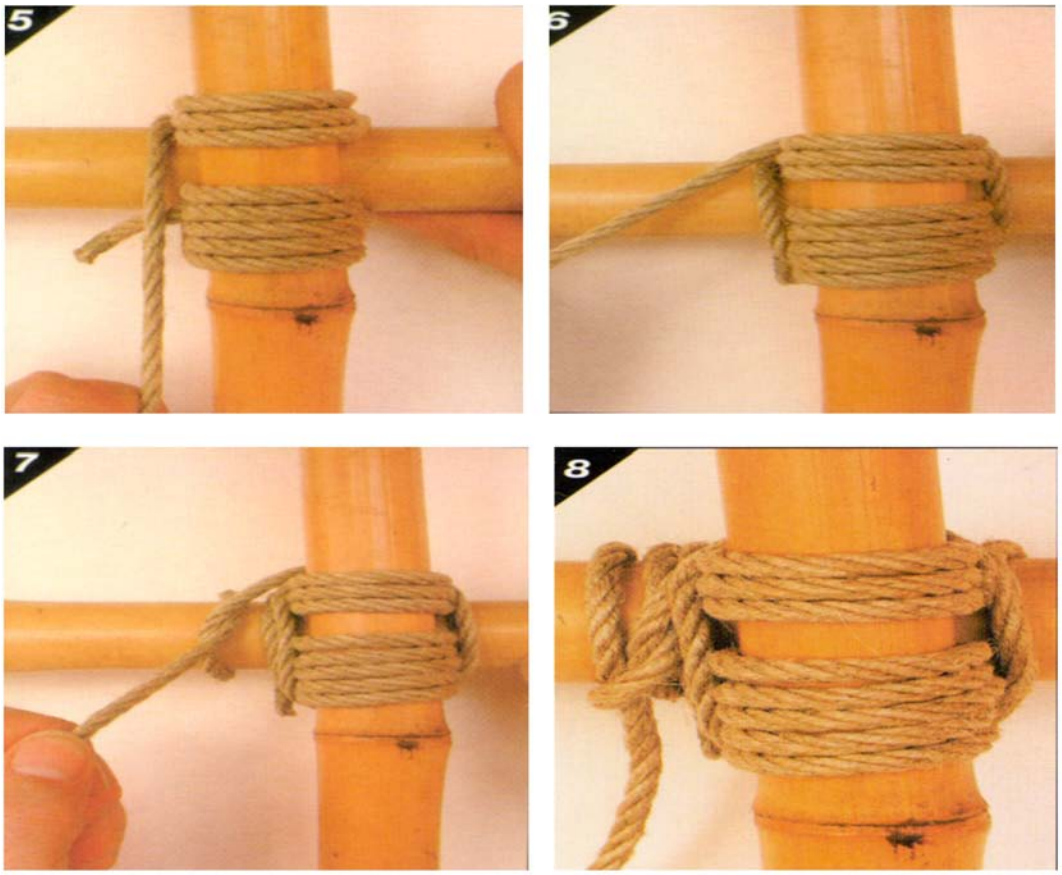


D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 181)

Figure 2E-3 Steps 1–4

1. With the vertical pole on top of the horizontal pole, make a clove hitch on the vertical pole just below the horizontal pole.
2. Bring all the cord around behind the horizontal pole.
3. Bring the cord over the vertical pole and back behind the horizontal pole to the clove hitch. Pull tight.
4. Carry on making two or three more complete turns around the two poles, pulling tight after each turn.

SQUARE LASHING



D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 181)

Figure 2E-4 Steps 5–8

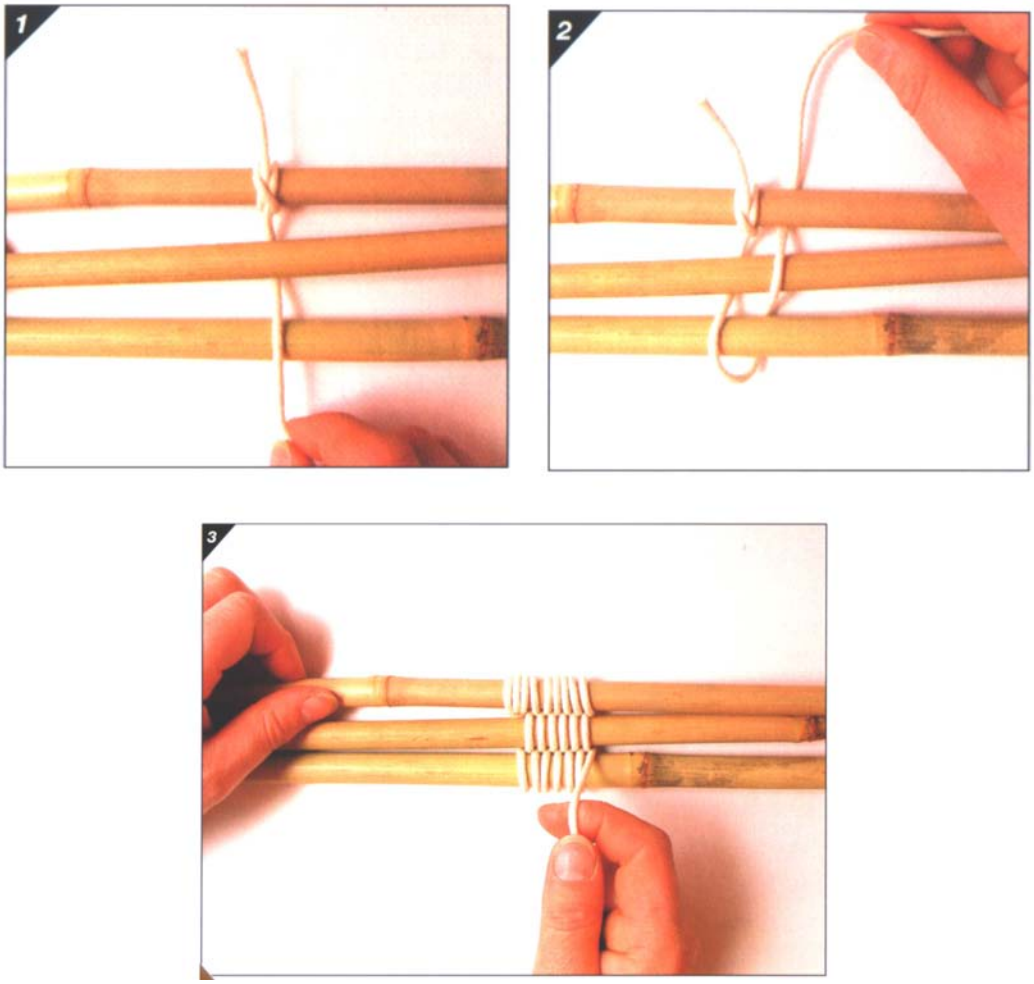
5. After passing the clove hitch, bring the cord around the horizontal pole from behind and start to wrap around the junction between the two poles. These are frapping turns—pull them as tight as possible.

6. Make two frapping turns.

7. Finish off with a clove hitch around the horizontal pole.

8. Pull tight to complete the square lashing.

FIGURE-OF-EIGHT LASHING

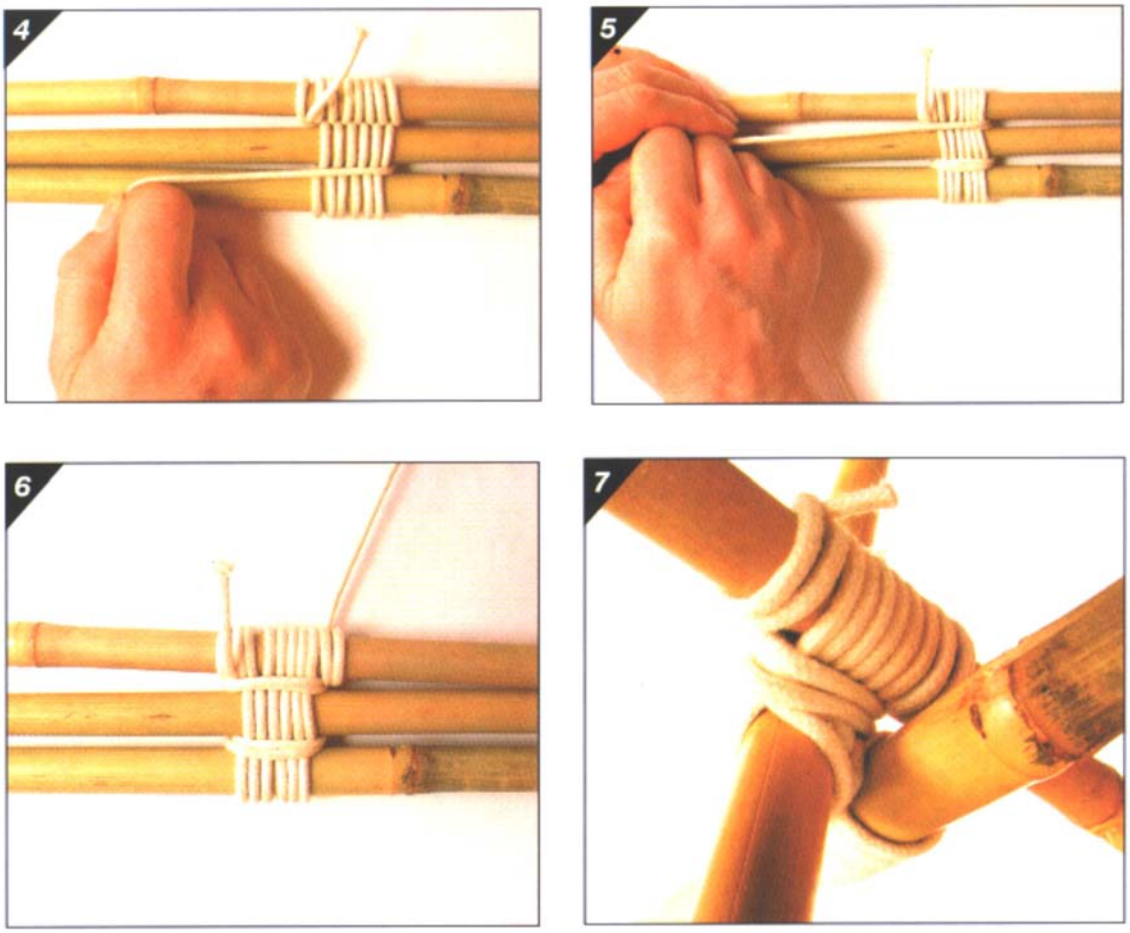


D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 187)

Figure 2E-5 Steps 1–3

1. Start with a clove hitch around one of the poles, and lead the rope under and over the other two poles.
2. Go around the pole furthest away from the start and weave the rope back over and under.
3. Continue to weave the rope in the figure-of-eight manner for seven or eight full passes before bringing the rope up between two of the poles.

FIGURE-OF-EIGHT LASHING



D. Pawson, Pocket Guide to Knots and Splices, PRC Publishing Ltd (p. 188)

Figure 2E-6 Steps 4–7

4. Pull the rope parallel to the poles and start to put in some frapping turns.
5. After making frapping turns between the first two poles move on to make frapping turns around the other pair of poles.
6. Finish off with a clove hitch around the pole from which you first started.
7. Open to create tripod.

SAMPLE MESSAGE WORKSHEET

Upon initiating a call, the transmission sequence is as follows:

1. The initiating call sign will transmit the call sign of the intended receiver followed by their own call sign with the phrase “THIS IS” between them (see Examples 1–2, step 1) and finishing with the word “OVER”.
2. The receiving call sign will acknowledge the call by transmitting its call sign and finishing with the word “OVER” (see Examples 1–2, step 2).
3. After a reply is received the initiating call sign will end the transmission. If nothing further is to be said, by transmitting its call sign or acknowledging the receipt of the answer with the word “ROGER” and concluding the message by ending with the word “OUT” (see Examples 1–2, step 5).

Example 1 of a radio call:

1. Hornet One transmits: Spitfire Two – this is Hornet One – message – over.
2. Spitfire Two responds to the initial call transmitting: Spitfire Two – over.
3. Hornet One continues by transmitting: Spitfire Two – report your location – over.
4. Spitfire Two replies by transmitting: Spitfire Two – shelter site – over.
5. Hornet One concludes radio transmissions by transmitting: Hornet One – roger – out.

Example 2 of a radio call:

1. Hornet One transmits: Spitfire Two – this is Hornet One – message – over.
2. Spitfire Two responds to the initial call, transmitting: Spitfire Two – send message – over.
3. Hornet One continues with the message, transmitting: Hornet One – will reach your location in too-fife minutes – over.
4. Spitfire Two responds to the message, transmitting: Spitfire Two – roger – over.
5. Hornet One concludes the call by: Hornet One – out.

Remember: The caller that starts the transmission must end it.

My call sign: _____ Call signs in other group: _____

Sample Questions that May be Used During the Radio Communications Activity

Which province do you live in?

How tall are you?

What is your shoe size?

Which squadron are you from?

Do you have a pet? If yes: What is your pet’s name?

What is your favourite TV show?

Which music group do you listen to the most?

Reminder: Remember to spell out names and enunciate numbers phonetically.

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CHAPTER 3

PO S297 – ASSIST WITH A GROUND SEARCH AND RESCUE (SAR) EXERCISE

ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

EO S297.01 – ACT AS A MEMBER OF A GROUND SEARCH AND RESCUE (SAR) PARTY

Total Time: 120 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Examples of confinement methods and clues are to be created prior to the lesson.

The lost person's survival site is to be created prior to the lesson. The site should contain all the elements of a survival site the cadets will encounter IAW A-CR-CCP-826/PG-001, Chapter 3, Annex B, Appendix 1 (S291 PC). In addition, the person found should have simulated minor injuries that will allow the cadets to demonstrate their basic wilderness first aid skills IAW EO S291.01 (Perform Minor First Aid in a Field Setting, Chapter 1, Section 1).

The briefing to be presented in TP 4 should be created based on the details of the lost person that will be found at the survival site. A sample briefing is located at Annex A.

Additional staff will be required during TP 4 for supervision and assisting in the search.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TP 1 to present the categories of lost persons and other general information to the cadets.

Demonstration was chosen for TPs 2 and 3 as it allows the instructor to explain and demonstrate limiting the search area and clue orientation the cadet is expected to learn.

A practical activity was chosen for TP 4 as it is an interactive way to experience being a member of a search and rescue party. This activity contributes to the development of search and rescue skills and knowledge in a fun and challenging setting.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet, in pairs, shall have acted as a member of a ground SAR party.

IMPORTANCE

It is important for the cadets to know how a ground SAR party operates so they know what to look for when searching for a lost person. It is easier for them to plan their rescue in a survival situation.

Teaching Point 1 **Explain Lost Person Behaviour and General Information**

Time: 10 min Method: Interactive Lecture

LOST PERSON BEHAVIOUR

Profiling. This is the recording and analysis of a person's psychological and behavioural characteristics, so as to assess or predict their capabilities or to assist in identifying a particular subgroup of people.

People that become lost exhibit specific traits that have been profiled from SAR statistics. These traits, if known to the SAR party, will greatly help in the search effort. While there will always be exceptions, lost persons will generally react to their situation based on these specific traits.

Children (1–3 Years)

Children will rarely be far from the point they were last seen, unless some mode of transportation is available (eg, a river, boat, vehicle). In general, children in this age group exhibit the following traits:

- They are unaware of the concept of being lost.
- Their navigation skills and sense of direction are practically non-existent.
- They tend to wander aimlessly with no specific objective.
- They will seek out the most convenient location to lie down and go to sleep, for example:
    - inside a hollow log,
    - under a thick bush,
    - under an overhanging rock, or
    - under a picnic table.

Children (3–6 Years)

Children will rarely be far from the point they were last seen, unless some mode of transportation is available (eg, a river, boat, vehicle, bicycle). In general, children in this age group exhibit the following traits:

- They are more mobile and capable of walking further than children aged 1–3 years.
- They have a concept of being lost and will generally try to return home or go back to someplace they are familiar with.
- They have definite interests and may be drawn away by animals, following older children or just exploring.
- When tired, they will generally try to find a sleeping spot.
- Some have been instructed to stay away from strangers and as a result will not answer or talk to searchers when called by name.

Children (6–12 Years)

This group is much more complex than the previous groups in that they may intentionally be running away. They may also seek out some mode of transportation (eg, boat, vehicle, bicycle). In general, members of this group exhibit the following traits:

- Their navigational and directional skills are much more developed.
- They are generally orientated to their normal, familiar surroundings and become confused in a strange environment.
- They may intentionally run away to avoid punishment, gain attention, or sulk.
- Whether it is intentional or accidental circumstances, they often will not answer when called.
- Darkness usually brings on a willingness to accept help and be found.
- Children this age suffer from the same fears and problems an adult would, but with a greater sense of helplessness.
- The circumstances of becoming lost often reflect they are being taken to an unknown environment or surroundings by parents or other adults they know.

Older Persons

Older persons have a wide variety of capabilities, but the many physical and mental conditions of this group define their behavioural characteristics. In general, members of this group exhibit the following traits:

- The lost person may be suffering from senility or Alzheimer's disease.
- They may be easily attracted by something that catches their attention.
- Their orientation may be to previously known environments rather than the present.
- Some may have conditions that require the same type of supervision that children do.
- The more lucid older persons may be more likely to over-extend and exhaust themselves rapidly which can result in a heart attack or other fatal complications.
- They may be hard-of-hearing or deaf which presents problems with detection.

People with Intellectual Disabilities (all ages)

This group is very difficult to categorize due to the wide variety of disabilities; however some general behavioural characteristics are:

- They act and react in much the same way as children from the age of 6–12.
- They generally will not respond to their spoken name.
- They most often will be hidden from view as a result of fright or seeking shelter from the elements.
- Many times they will stay in one place for days.
- They usually have no physical impairments but they may also do nothing to help themselves.

Hikers

Hikers are one of the groups more likely to become lost and their behavioural characteristics include:

- They usually rely on trails with a set destination in mind.
- Problems or complications may arise with navigation when trail conditions change or become obscure, for example:
    - a slide over the trail;
    - the trail is not maintained;
    - the trail is covered intermittently with snow in the spring; or
    - poorly defined trail junctions.
- Often hiking party members may be mismatched in abilities and one person falls behind, becomes disoriented and ultimately lost.
- Cutting switchbacks (a type of road/trail used to ascent/descent a slope by using almost 180 degree turns to follow the slope at a gentler angle for ease of driving/walking) will many times lead to disorientation or going down the wrong hill or drainage.
- They may be dependent on travel aids and trails for navigation.

GENERAL INFORMATION

Most adults and older youth do not have specific traits that may be used to predict their behaviour. The most important clue to predicting their behaviour is the reason (eg, hiking) they were in the wilderness in the first place. The following general information is relevant (to all groups) and may be used when trying to predict the behaviour of a lost person, their movements and whereabouts.

Category and Circumstances

Can a lost person be categorized? Children are different from hikers, who are different from the elderly, etc. By categorizing a lost person, the search effort may be orientated to the most likely area. The circumstances surrounding the person before they become lost contribute greatly in predicting their behaviour. Effort must be made to discover these circumstances.

Terrain

The terrain affects travel. The area should be examined for barriers, escape routes, drainages, ridges, etc. Flat terrain generally yields different travel distances (farther) than mountainous.

Weather

Weather may restrict the lost person's movement. It is also a principle contributor to hypothermia, which may affect movement and decision-making. Poor weather increases the importance of the length of time a person has been lost (eg, increased risk of hypothermia) and may require increased SAR efforts.

Personality

It has a substantial effect on the lost person's ability to survive. Consider the aggressive personality versus the ponderer or pessimist.

Physical Conditions

Are the lost person's physical capabilities limited in any way? A poor condition means an increased susceptibility to hypothermia. It also has a direct bearing on the distance a lost person will travel.

Medical Problems

Is their any condition that could possibly precipitate abnormal behaviour? This could have a direct bearing on the distance a lost person will travel. Examples of medical problems that may affect a person's behaviour:

- weak heart,
- diabetes,
- allergies, and
- not having taken medication when needed (they do not have their prescription with them).

Through determining if the lost person is affected by any of the discussed conditions, logical assumptions may be made on their possible behaviour in order to determine the most likely area to orientate the search effort.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. Where are the most likely places to find a lost child between the ages of one and three?

Q2. Where would a hiker most likely be found?

Q3. How does weather affect the behaviour of a lost person and the need to find them?

ANTICIPATED ANSWERS

A1. Lying down/asleep inside a hollow log, under a thick bush, under an overhanging rock, or under a picnic table.

A2. On or near a trail.

A3. Weather restricts the lost person's movement and is a principle contributor to hypothermia. Poor weather increases the importance of the length of time a person has been lost (eg, increased risk of hypothermia) and may require increased SAR efforts.

Teaching Point 2 **Explain and Demonstrate Limiting the Search Area**

Time: 20 min Method: Demonstration

Demonstrate examples of limiting techniques, based on the types (eg, road block, track trap, string line) created (based on CSTC terrain) for the lesson, when it is being discussed.

LIMITING THE SEARCH AREA

Why Limit the Search Area?

The search area should be limited as the smaller the area that must be searched for the lost person, the less time that will be required to effectively cover it. In addition, the number of searchers required will be less as a smaller spacing can be placed between party members.

Confinement. An effort made to establish a search perimeter which encompasses the lost person and beyond which the person is unlikely to pass without being detected.

Confinement Methods

Confinement methods are used to establish a perimeter around the area being searched and to detect a lost person that may wander out of the search area. Types of confinement methods include:

- **Road Block/Trail Block/Patrols.** Blocks and patrols are designed to cover the parts of the perimeter made up of roads and trails. Blocks serve to confine the search area and also inform through traffic of a search in progress. Patrols serve to cover stretches of roads and trails between the blocks.
- **Lookouts.** While aerial search has replaced the need for most fixed lookout towers, stationing lookouts on high ground is also a viable method of establishing a perimeter.
- **Track Traps.** Sections of trail or a road edge that has been brushed clear of all traces of use. Patrols would, on a regular basis, examine track traps to check for footprints for an indication that the lost person may have left the confinement area.
- **String Lines.** A method of confinement where a large spool of string is mounted in a backpack. As a SAR member walks through an area, the string unrolls, which is then tied by another SAR member approximately one metre (three feet) above the ground leaving a very visible perimeter. Arrows could also be placed on the string directing the lost person that comes across the string line to the closest SAR group, usually located at a road or trail block.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. Why limit the search area?

Q2. Define “confinement”.

Q3. What is a string line?

ANTICIPATED ANSWERS

A1. The search area should be limited as the smaller the area that must be searched for the lost person, the less time that will be required to effectively cover it. In addition, the number of searchers required will be less or a smaller spacing can be placed between party members.

A2. Confinement is an effort made to establish a search perimeter which encompasses the lost person and beyond which the person is unlikely to pass without being detected.

A3. A string line is a method of confinement where a string is tied approximately one metre above the ground leaving a very visible perimeter for the lost person.

Teaching Point 3 **Explain and Demonstrate Clue Orientation**

Time: 10 min Method: Demonstration

Demonstrate examples of clues, based on the types (eg, footprint, food wrapper, trip plan, an eyewitness account, light flashing in the distance) created for the lesson, when it is being discussed.

CLUE ORIENTATION

Searching for clues helps discover the characteristics and possible behaviour of the lost person that are key to limiting the search area.

General Principles

The general principles of clue orientation are:

- Good clue seeking is a learned skill and must be practiced to develop a sense of what is the minimum of information needed to decide on how to categorize a lost person. Clues found and deciphered allow the SAR leader to orientate the search effort to the most likely area.
- Avoid forming opinions and then gathering information to support that opinion. It may limit the searcher to only accepting clues that support their opinion.
- A SAR leader gathers information from everyone, as no one person can know all the facts.
- Assemble a complete profile of the missing person and their situation and let it offer direction.

Searching for Clues

Types of clues that SAR leaders search for:

- **Physical.** Examples include footprints, food wrappers and dropped/lost items.
- **Recorded.** Examples include a trail register, summit logs or a trip plan.
- **People.** These are eyewitness accounts, the point last seen, family and friends.
- **Event.** Examples include a flashing light, a campfire or a ground-to-air signal.

The cadets should evaluate any physical clues they find for relevance. For example, a fresh candy wrapper possibly dropped by the lost person versus one that has been there for some time (dirty and weathered).

CONFIRMATION OF TEACHING POINT 3

QUESTIONS

Q1. Why is searching for clues important?

Q2. Why should a searcher avoid making an opinion and then search for clues?

Q3. Name the four types of clues.

ANTICIPATED ANSWERS

A1. Searching for clues helps discover the characteristics and possible behaviour of the lost person that are key to limiting the search area.

A2. It may limit the searcher to only accepting clues that support their opinion.

A3. The four types are: physical, recorded, people and an event.

Teaching Point 4 **Cadets, in Pairs, Will Participate in a Ground SAR Exercise**

Time: 70 min Method: Practical Activity

Planning and preparation are key to the running of this activity. Ensure the lost person is in position before beginning the search.

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets, in pairs, act as a member of a SAR party.

RESOURCES

- Prepared briefing,
- Compass,
- First aid kit,
- Hand-Held radio, and
- Whistle.

ACTIVITY LAYOUT

A large outdoor area that can be confined.

ACTIVITY INSTRUCTIONS

1. Issue equipment, to include:
   a. compass (one per pair),
   b. first aid kit (two per flight),
   c. hand-held radio (one per pair), and
   d. whistle (one each).
2. Give a briefing, to include:
   a. situation;
   b. details of the confinement area;

c. formation: creeping line (like when cadets do a garbage sweep);

d. distance between pairs: 10–20 m (30–60 ft) based on the terrain;

e. call signs and radio frequency to be used;

f. magnetic bearing (search direction);

g. safety bearing (if become lost or disoriented); and

h. actions to take if the cadets discover a clue/lost person: radio in, wait for instructions.

3. Have the cadets deploy to the search start line.
4. Have the cadets respond to a radio check.
5. Begin the search.
6. Radio as required.
7. When the cadets find a clue, they will radio in.
8. When the cadets find the lost person they will radio in.
9. Perform first aid on simulated minor injuries of the lost person.
10. Have the cadets examine the survival site.
11. SAR leader will conduct a debrief of the activity.
12. Have the cadets return equipment.

SAFETY

- A safety bearing shall be given to the cadets in case they become lost or disoriented.
- Staff should be placed in the centre and at the ends of the formation.

CONFIRMATION OF TEACHING POINT 4

The cadets' participation in the activity will serve as confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in the SAR activity will serve as confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

Understanding how a SAR party operates, a person in a survival situation will have a better idea of knowing what is being looked for and where. If you know how to search, you should know how to be found. This information should allow the cadets to better plan for being rescued through selecting their site location, signal placement and clues known and also found.

INSTRUCTOR NOTES/REMARKS

A briefing will be conducted before the practical activity, to include:

- the scenario (eg, downed pilot, lost hiker); and
- the confinement area.

This EO will be conducted after EO S291.01 Perform Minor First Aid in a Field Setting, Chapter 1, Section 1) and PO S299 (Participate in Ground Navigation, Chapter 4) and before the rest of PO S291 (Perform Survival Skills, Chapter 1). Refer to A-CR-CCP-826/PG-001, Chapter 2, Annex B for a sample course schedule.

A complete survival site shall be set up prior to the practical activity.

Once this lesson is completed cadets should discover the lost person's survival site. The site should contain all the elements of a survival site the cadets will encounter during PC S291 (Perform Survival Skills, Chapter 1). In addition, the person found should have simulated minor injuries that will allow the cadets to demonstrate their basic wilderness first aid skills IAW EO S291.01 (Perform Minor First Aid in a Field Setting, Chapter 1, Section 1).

REFERENCES

A3-052 (ISBN 0-913724-30-0) LaValla, P. (1999). *Search Is an Emergency*. Olympia, WA: ERI International Inc.

C3-208 (ISBN 0-7637-4807-2) National Association for Search and Rescue (2005). *Fundamentals of Search and Rescue*. Mississauga, ON: Jones and Bartlett Publishers Canada.

SAMPLE BRIEFING

Situation

A 26 year old male, Jim Grapevine, was a member of a group of hikers travelling through the park towards Hope Lake. He was lagging behind the group and was told to catch up. An hour after the group reached the lake, he still had not caught up. The group decided to look for him on their own and by nightfall, they returned to the lake without finding any sign of him. All the next day they backtracked along their trail to the point he was last seen. They searched back towards the lake, still finding no signs. After a day and a half of searching, they decided to contact the authorities. As there was no cell phone signal at the lake, they hiked the next morning to where they could make the emergency call. It has now been two days since Jim was last seen and through examining the clues we have, I have decided to concentrate the search in this area. Jim is an inexperienced hiker but very coolheaded. He has a very creative personality and was tired but in good spirits when he was last seen. He was carrying only his own gear. No other member of the group can say what he had except for a sleeping bag and clothes.

Details of the Confinement Area

A lookout has been airlifted to the top of Cloud Hill, which overlooks the area. Increasing low cloud cover will make the lookout ineffective in about two hours. The main road is being patrolled by vehicle and the Hope River is being patrolled by boat. Track traps have been set on the main trail from the lake.

Formation

The formation we will be using is the creeping line (like when cadets do a garbage sweep). Remember to move slowly so as to not get too far ahead of the other pairs.

Distance Between Pairs

Based on the type of terrain we will be encountering, the distance between pairs will be 10 m (30 ft).

Call Signs and Radio Frequency to be Used

Call signs that will be used are:

SAR leader: Sierra

Left anchor (end) team: Lima Major

Right anchor (end) team: Romeo Major

First pair to the left of the SAR leader: Lima One

Second pair to the left of the SAR leader: Lima Two

etc...

First pair to the right of the SAR leader: Romeo One

Second pair to the right of the SAR leader: Romeo Two

etc...

The radio frequency will be 6.07, check your radio now to ensure it is on the correct frequency.

Magnetic Bearing (Search Direction)

The magnetic bearing you will be searching on will be 72 degrees. It is important that you stay in your search lane and not veer into a neighbouring team’s lane. Remember your pacing techniques when bypassing obstacles. If possible, use a steering point.

Safety Bearing (if Become Lost or Disoriented)

If you become lost or disoriented, radio the SAR leader, who will assist you to get back on track. If you are also out of radio contact, use a magnetic bearing of 260 degrees which will bring you to Highway 43, which is being patrolled. Wait on the side of the road and flag down the patrol vehicle when you see it.

Actions to Take if the Cadets Discover a Clue/Lost Person: Radio In, Wait for Instructions

If you find a clue, stop and radio the SAR leader. Follow the instructions given. All other teams should stop and wait for instructions. Depending on the type of clue found, the search may be reoriented based on the new information.

If you find the lost person, one of you shall evaluate the situation to assess whether it is safe to approach. Remember your first aid training about approaching an area. The other person should radio the SAR leader with the discovery, and wait for instructions.

Does anyone have any questions?

CHAPTER 4
PO S299 – PARTICIPATE IN GROUND NAVIGATION

ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 1

EO S299.01 – IDENTIFY PARTS OF A COMPASS

Total Time: 80 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Photocopy Annexes A and B for each cadet.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for this lesson to present basic material, orient the cadets to the compass, and generate interest.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have identified the parts of a compass.

IMPORTANCE

It is important for the cadets to be able to use a compass to navigate. Each part of a compass has a specific name used to identify the part and its function. The cadets will rely on this information throughout navigation and survival training.

Teaching Point 1 **Explain the Principles Behind the Workings of a Compass**

Time: 15 min Method: Interactive Lecture

The compass is an important tool used in wilderness navigation. Be precise when using a compass, a small error in calculation or measurement can equal a significant error in the field.

Even with the advent of Global Positioning System devices, a magnetic compass remains a viable navigation aid because it does not require batteries and remains reliable year after year.

The Chinese discovered the orientating effect of magnetite, or lodestone, as early as the 4th century BC. In 101 BC, Chinese ships reached the east coast of India for the first time, possibly with help from a magnetic compass. By the 10th century, they had developed a floating compass for use at sea. Western Europeans had developed a compass by 1187, Arabs by 1220, and Scandinavians by 1300. Columbus used a magnetic compass on his first trans-Atlantic trip in 1492.

A-CR-CCP-121/PT-001, Royal Canadian Army Cadet Reference Book (p. 5-33)

Figure 4-1-1 Chinese Floating Compass

HOW A COMPASS WORKS

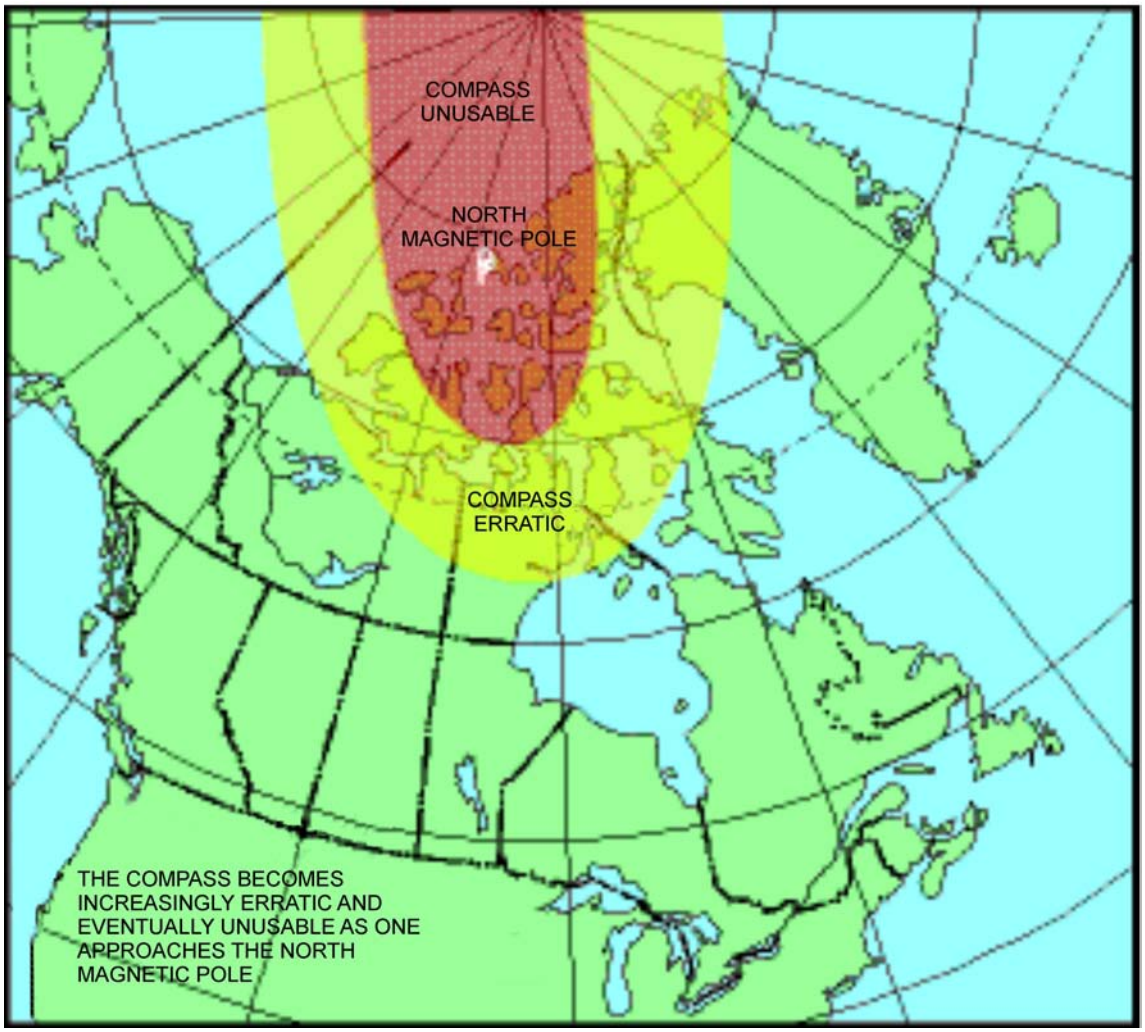
Regardless of their intended purpose or the complexity of their construction, most compasses operate on the same basic principle. A small, elongated, permanently magnetized needle is placed on a pivot so that it may rotate freely on the horizontal plane. The Earth's magnetic field, which is shaped approximately like the field around a simple bar magnet, exerts forces on the compass needle, causing it to rotate until it comes to rest in the same horizontal direction as the magnetic field.

The Earth has a north and a south magnetic pole. The north magnetic pole is located at approximately 78.9 degrees north latitude and 103.8 degrees west longitude, about 1 000 km from the geographical north pole.

The magnetic north pole is constantly shifting geographic position, and in 2001 the Geological Survey of Canada determined it is moving northwest at approximately 40 km per year.

The force of the magnetic field is responsible for the direction in which a compass needle is pointing, and decreases in strength as one nears the north magnetic pole. As one moves closer to the north magnetic pole, the compass will start to behave erratically, and eventually, as the horizontal force decreases even more, the compass will not point to north.

Other natural phenomena, like earthquakes, can change the magnetic field locally.



A-CR-CCP-121/PT-001 (p. 5-33)

Figure 4-1-2 Earth's Magnetic Field

Teaching Point 2 **Explain and Have the Cadets Identify the Cardinal Points**

Time: 20 min Method: Interactive Lecture

The four main directional indicators are called cardinal points. They are marked as points or arrowheads on a traditional magnetic compass rose. The cardinal points are north, east, south and west. Though the names may seem random, there are simple specific ways to establish each direction, which should work anywhere on Earth where there is a view of the sky. North and south are oriented toward the respective poles of the Earth; the Earth's rotation defines the orientation of east and west.

THE FOUR CARDINAL POINTS

The outside of a compass dial is graduated in 360 degrees, with the cardinal points 90 degrees apart from one another. The four cardinal points and the corresponding degrees of a compass include:

- North (N) at 0 and 360 degrees,
- East (E) at 90 degrees,

- South (S) at 180 degrees, and
- West (W) at 270 degrees.

THE FOUR INTER-CARDINAL POINTS

An inter-cardinal point is one of the four intermediate compass directions located halfway between the cardinal points:

- **Northeast (NE).** 45 degrees; halfway between N and E; is the opposite of SW.
- **Southeast (SE).** 135 degrees; halfway between S and E; is the opposite of NW.
- **Southwest (SW).** 225 degrees; halfway between S and W; is the opposite of NE.
- **Northwest (NW).** 315 degrees; halfway between N and W; is the opposite of SE.

The inter-cardinal points also make up the four main quadrants:

- **Northeast (NE).** 0–90 degrees.
- **Southeast (SE).** 90–180 degrees.
- **Southwest (SW).** 180–270 degrees.
- **Northwest (NW).** 270–360 degrees.

It is difficult in a survival situation to determine direction beyond the four cardinal points and the four main quadrants without the aid of a compass. Quadrants are an easy method of communicating direction to search and rescue personnel.

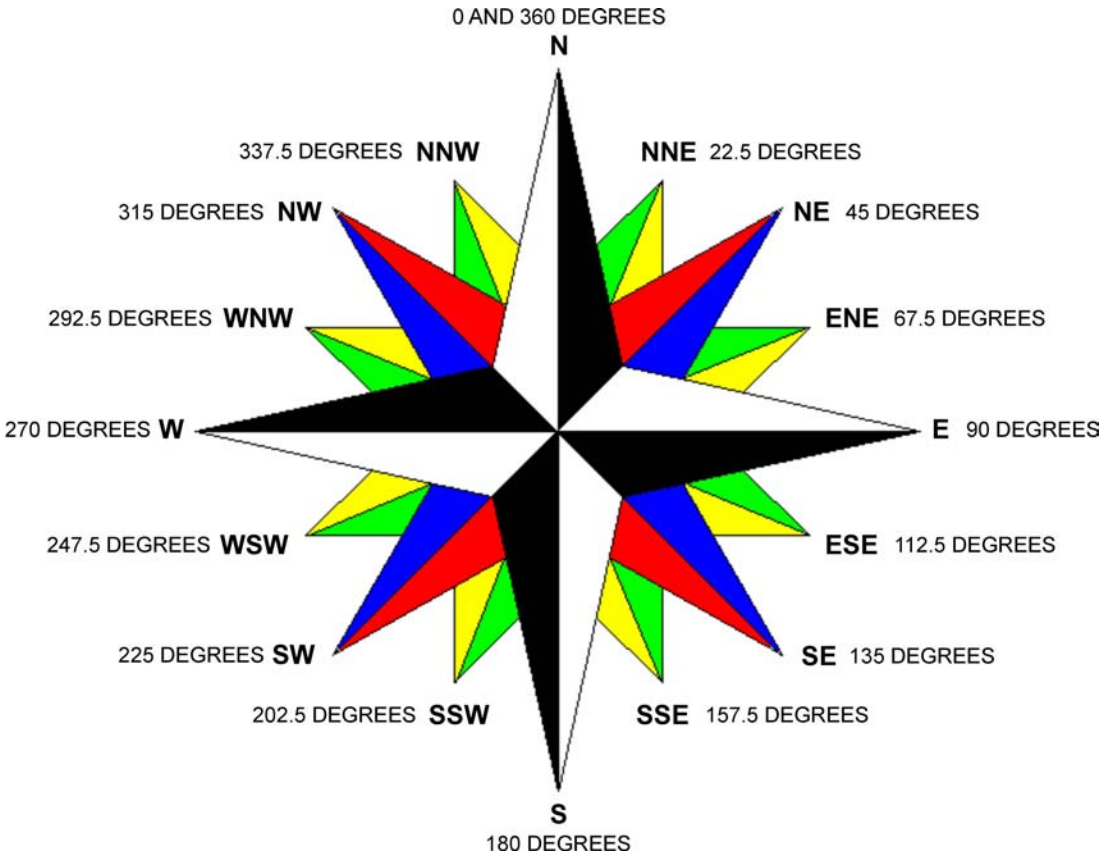
The use of quadrants is important as they are the first indicator of direction. Knowing the quadrant helps avoid the 180 degree error. If the compass points at 35 degrees (NE quadrant), but the desired location is in a SW direction, then there is a 180 degree error.

THE EIGHT INTERMEDIATE POINTS

The eight intermediate points are located halfway between each cardinal point and inter-cardinal point. Measured clockwise, they include:

- **North-North-East (NNE).** 22.5 degrees; halfway between N and NE.
- **East-North-East (ENE).** 67.5 degrees; halfway between NE and E.
- **East-South-East (ESE).** 112.5 degrees; halfway between E and SE.
- **South-South-East (SSE).** 157.5 degrees; halfway between SE and S.
- **South-South-West (SSW).** 202.5 degrees; halfway between S and SW.
- **West-South-West (WSW).** 247.5 degrees; halfway between SW and W.
- **West-North-West (WNW).** 292.5 degrees; halfway between W and NW.
- **North-North-West (NNW).** 337.5 degrees; halfway between NW and N.

In everyday use, we do not distinguish beyond the four inter-cardinal points and their assigned quadrants.



D Cdts 3, 2007, Ottawa, ON: Department of National Defence

Figure 4-1-3 Cardinal Points

ACTIVITY

Time: 5 min

OBJECTIVE

The objective of this activity is to have the cadet identify the four cardinal points, the inter-cardinal points and the eight intermediate points.

RESOURCES

Cardinal Points handout located at Annex B.

Blank Cardinal Points handout located at Annex B.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

Distribute copies of the blank cardinal points diagram located at Annex B and have each cadet fill in as many of the missing parts as possible.

Distribute copies of the filled in cardinal points diagram located at Annex B and have each cadet correct any incorrect or missing information.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 2

The cadets' participation in the activity will serve as the confirmation of this TP.

Teaching Point 3 **Explain and Have the Cadets Identify the Parts of a Compass**

Time: 20 min Method: Interactive Lecture

Divide the cadets into equal groups according to the number of compasses available. Starting with the compass opened, use the diagram in Figure 4-1-4 to identify the parts of a compass from the top (sight) to the bottom (screwdriver).

PARTS OF A COMPASS

A - Sight. Located at the top of the compass cover, used to determine a bearing.

B - Compass Cover. Protects the compass dial and houses the sighting mirror.

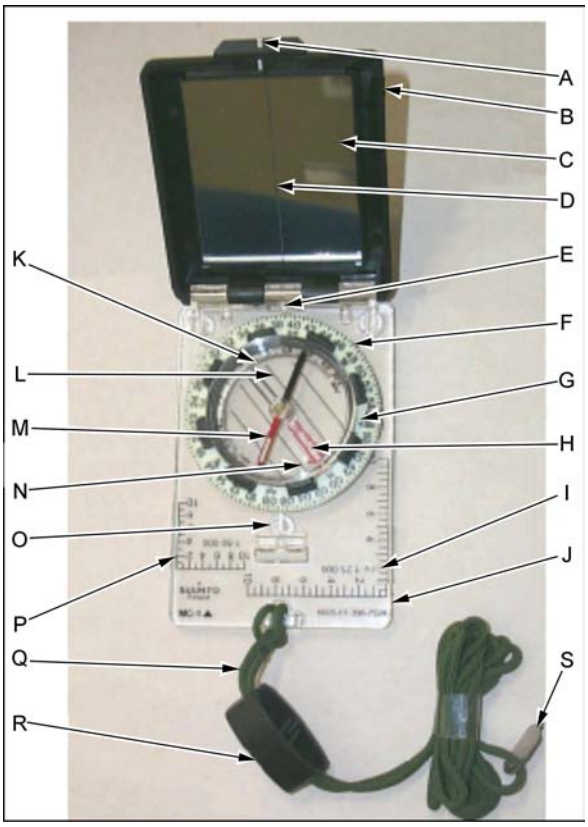
C - Sighting Mirror. Used to see the compass dial while checking a bearing.

D - Sighting Line. Used to align a bearing.

E - Luminous Index Point. Located at the top of the compass dial, where a bearing is set and read from.

F - Compass Dial. Houses the magnetic needle, the orienting arrow and the declination scale on the inside and the dial graduations on the outside.

G - Dial Graduations. The compass dial is graduated in two degree divisions from 0 to 360 degrees. The dial is rotated by hand.



A-CR-CCP-121/PT-001 (p. 5-33)

Figure 4-1-4 Compass

H - Orienting Arrow. Red and located inside the compass dial. It is used to line up the magnetic needle and is always set at 0/360 degrees.

I - Romer 1:25 000. Used to measure grid references (GR) on maps with a 1:25 000 scale.

J - Compass Base Plate. A clear piece of flat plastic, where the cover, dial and lanyard are attached.

K - Declination Scale. Used to compensate for the variation of magnetic declination between the compass and the map being used.

L - Compass Meridian Lines. Are black or red lines inside the compass dial and used to line up the compass dial with the grid lines on a map.

M - Magnetic Needle. Spins freely and points to magnetic north. The south end of the compass needle is black and the north end is red with a luminous patch.

When the magnetic needle is lined up with the red orienting arrow, the mnemonic “Red in the Bed” is used to remember which end of the needle belongs between the arrows.

N - Luminous Orienting Points. There are two luminous orienting points located on either side of the orienting arrow.

O - Luminous Index Point. The luminous index point at the bottom of the compass dial is where a back bearing is read from.

P - Romer 1:50 000. Used to measure GR on maps with a 1:50 000 scale.

Q - Safety Cord or Lanyard. Used to fasten the compass to the body.

R - Adjustable Wrist Lock. Used to attach the compass to the wrist.

S - Screwdriver. The tiny screwdriver at the end of the safety cord is used to turn the screw to adjust the declination scale.

T - Declination Adjustment Screw. Located on the back side of the compass dial and is used to adjust the declination scale (not shown).

After exposure to direct light the luminous points on a compass will glow in the dark, making operating a compass at night possible.

ACTIVITY

Time: 5 min

OBJECTIVE

The objective of this activity is to have the cadet identify the parts of a compass.

RESOURCES

Parts of a Compass handout located at Annex A.

Blank Parts of a Compass handout located at Annex A.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

1. Distribute copies of the blank parts of a compass diagram located at Annex A and have each cadet fill in as many of the parts as possible.
2. Distribute copies of the filled in parts of a compass diagram located at Annex A and have each cadet correct any incorrect or missing information.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 3

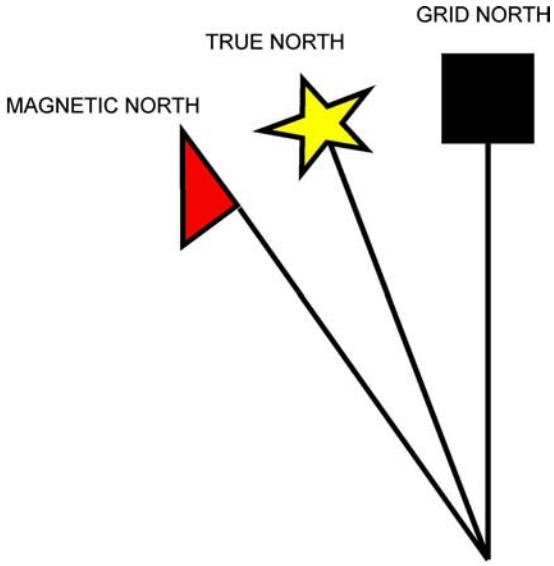
The cadets' participation in the activity will serve as the confirmation of this TP.

Teaching Point 4 **Explain and Have the Cadets Identify the Three Norths**

Time: 10 min Method: Interactive Lecture

In navigation there are three different norths that are used—true north, grid north and magnetic north. Each north varies a small amount from each other. A diagram representing the three norths can be found in the margin of the map being used.

Draw Figure 4-1-5 on the board and draw the symbol for each north as it is explained to the cadets.



D Cdts 3, 2007, Ottawa, ON: Department of National Defence

Figure 4-1-5 Three Norths

True North. True north is located at the top of the Earth where the geographic north pole is found, and is where all lines of longitude meet. In the diagram on the map, true north is represented by the north star (Polaris).

Grid North. Grid north is the north indicated by the grid lines (eastings) on a topographical map. The easting lines run parallel to each other and will never meet at the north pole; because of this, grid north points off slightly from true north. In the diagram on the map, grid north is represented by a square (as in a map grid square).

Magnetic North. Magnetic north is the direction in which the compass needle points. This direction is to the magnetic pole which is located in the Canadian arctic and is slightly different from true north. In the diagram on the map, magnetic north is represented by a needle (as in a compass).

CONFIRMATION OF TEACHING POINT 4

QUESTIONS

Q1. What symbol is used to represent true north?

Q2. What symbol is used to represent grid north?

Q3. What symbol is used to represent magnetic north?

ANTICIPATED ANSWERS

A1. A star, as in Polaris.

A2. A square, as in a grid square.

A3. A needle, as in a compass.

END OF LESSON CONFIRMATION

The cadets' participation in identifying the four cardinal points, the inter-cardinal points, the eight intermediate points and the parts of a compass in TPs 2 and 3 will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

Compasses are used during survival training exercises. Identification of the parts and the proper use of a compass are essential to ensure accurate navigation.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

A2-041 B-GL-382-005/PT-001 Canadian Forces. (2006). *Maps, Field Sketching, Compasses and the Global Positioning System*. Ottawa, ON: Department of National Defence.

C2-041 (ISBN 0-07-136110-3) Seidman, D. and Cleveland P. (1995). *The Essential Wilderness Navigator*. Camden, ME: Ragged Mountain Press.

C3-003 (ISBN 1-896713-00-9) Tawrell, P. (1996). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Paul Tawrell.

ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 2

EO S299.02 – DETERMINE DIRECTION USING THE SUN

Total Time: 40 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

A practical activity was chosen for this lesson as it is an interactive way to introduce the cadets to navigation. This activity contributes to the development of skills and knowledge in a fun and challenging setting.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have determined direction using the sun.

IMPORTANCE

It is important for the cadets to be able to determine direction using the sun in a survival situation so they can navigate to and from their survival site without the aid of a compass or map.

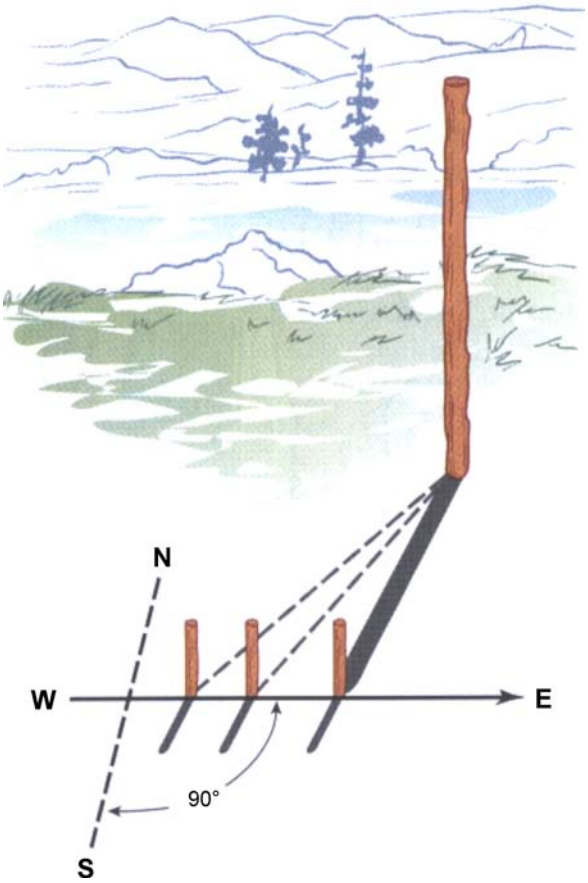
Teaching Point 1 **Have the Cadets Determine Direction Using a Shadow Stick**

Time: 25 min Method: Practical Activity

DETERMINE DIRECTION USING A SHADOW STICK

In a survival situation one may not have a map of the area, a compass or the use of a watch. On this occasion it may be necessary to use natural phenomena, such as the sun to determine direction. The sun can be used to find north using a branch or stick to cast a shadow on the ground.

A shadow stick works because the sun always travels east to west, even though it may not rise at exactly 90 degrees or set at exactly 270 degrees. The tip of the shadow sticks' shadow moves in the opposite direction, so the first shadow tip is always west of the second, anywhere on Earth. Improvised methods are only general indicators of direction. The shadow stick is more accurate and easier to read when the stick is narrow.



National Association of Search and Rescue, Fundamentals of Search and Rescue, Jones and Bartlett Publishing (p. 76)

Figure 4-2-1 Shadow Stick

ACTIVITY

Time: 20 min

OBJECTIVE

The objective of this activity is to have the cadets construct a shadow stick and determine direction using the sun.

RESOURCES

Compass.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

1. Divide the cadets into groups of three or four.
2. Have the cadets find a 45–60 cm straight stick.
3. Find a level vegetation-free spot. Push the 45–60 cm straight stick into the ground about 10 cm so it will remain upright, inclining it by 5–10 degrees to get a longer, bigger shadow if necessary.
4. Mark the tip of the shadow with a stone. Wait until the shadow tip moves a few inches (10–15 minutes with a 45 cm stick).

Use the 10–15 minutes to instruct TP 2.

5. Mark the position of the new shadow tip.
6. Draw a straight line from the first mark through the second mark, and about a 30 cm past it (as illustrated in Figure 4-2-1).
7. Verify the bearings with a compass.

The line drawn indicates the east–west line. The first mark made is west and the last mark made is east. A line perpendicular to the east-west line is a north-south line.

SAFETY

N/A.

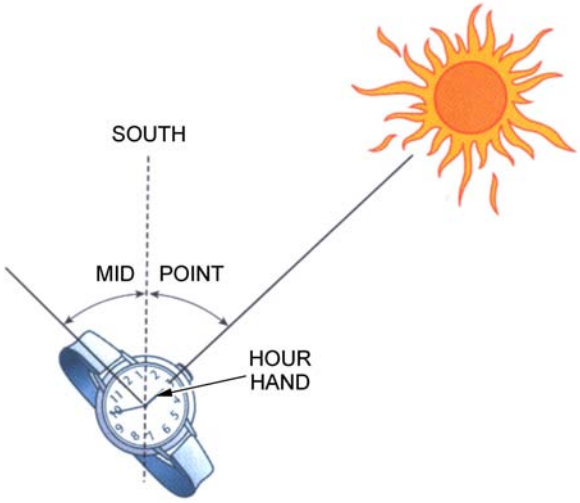
CONFIRMATION OF TEACHING POINT 1

The cadets' participation in this activity will serve as the confirmation of this TP.

Teaching Point 2 **Have the Cadets Determine Direction Using an Analog Watch**

Time: 10 min Method: Practical Activity

An ordinary analog watch can help establish direction using either standard or daylight saving time.



National Association of Search and Rescue, Fundamentals of Search and Rescue, Jones and Bartlett Publishing (p. 76)

Figure 4-2-2 Analog Watch

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets determine direction using an analog watch.

RESOURCES

Analog watch.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

Point the hour hand towards the sun and determine the halfway point between the hour hand and 12 o'clock or 1 o'clock (daylight time). The halfway point indicates a north-south line (south in the northern hemisphere and north in the southern hemisphere).

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 2

The cadets' participation in this activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in constructing a shadow stick and determining direction using and analog watch will serve as the confirmation for this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

It is important for the cadets to be able to determine direction using the sun in a survival situation so they can navigate to and from their survival site without the aide of a compass or map.

INSTRUCTOR NOTES/REMARKS

There will be more time required than is allocated in TP 2 to observe the change of the sun's effect on the shadow stick. It is recommended that the shadow stick be constructed close to the exercise site, in order to allow the cadet to observe the changes.

REFERENCES

C2-041 (ISBN 0-07-136110-3) Seidman, David, Cleveland, Paul (1995). *The Essential Wilderness Navigator*. Cadmen, ME: Ragged Mountain Press.

C3-002 (ISBN 0-00-653140-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.

C3-003 (ISBN 1-896713-00-9) Tawrell, P. (1996). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Paul Tawrell.

C3-208 (ISBN 0-7637-4807-2) National Association for Search and Rescue. (2005). *Fundamentals of Search and Rescue*. Centreville, VA: Jones and Bartlett Publishers Inc.

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ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 3

EO S299.03 – DETERMINE DIRECTION AT NIGHT

Total Time: 40 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Determine a good night to perform this activity by checking both a moon calendar and local weather conditions.

Photocopy handouts located at Annex C for each cadet.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

Demonstration and performance was chosen for this lesson as it allows the instructor to demonstrate determining direction using the moon and locating constellations required to find north, while providing an opportunity for the cadet to practice the skill under supervision.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have determined direction at night.

IMPORTANCE

It is important for the cadets to be able to navigate at night so they will have the skills to find their way in the dark. In a survival situation, being able to determine direction in the dark is a skill that can assist in being rescued.

Teaching Point 1 **Demonstrate, Explain and Have the Cadets Determine Direction Using the Moon**

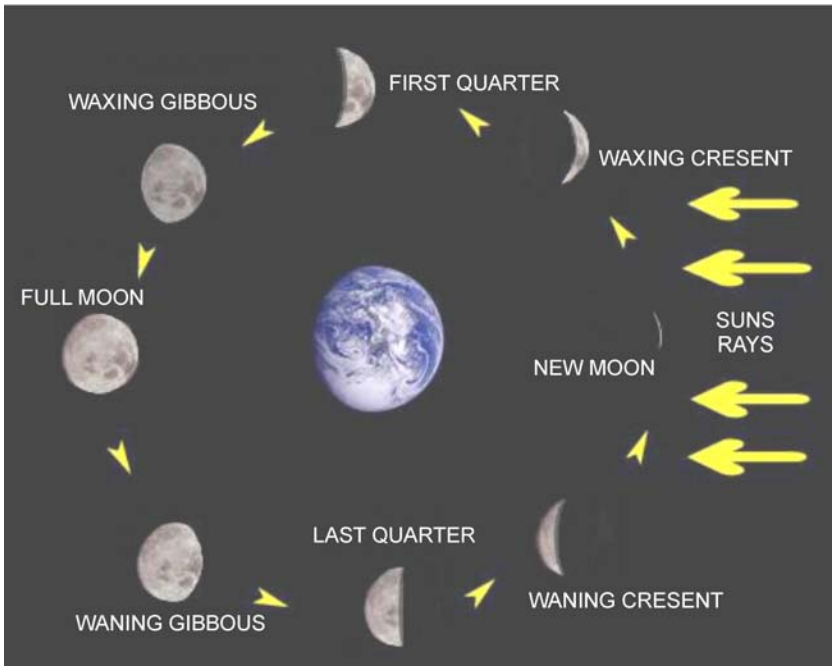
Time: 10 min Method: Demonstration and Performance

This TP must be conducted during a clear night when the moon is in one of its crescent phases. Determine the phases of the moon on a moon calendar or through the internet.

IDENTIFY THE PHASES OF THE MOON

The phases of the moon are caused by the relative positions of the Earth, sun, and moon. The moon rotates around the Earth, on average, once every 27 days, 7 hours and 43 minutes. The sun always illuminates the half of the moon facing the sun (except during lunar eclipses). When the sun and moon are on opposite sides of the Earth, the moon appears “full” like a bright, round disk. When the moon is between the Earth and the sun, it appears dark, a “new” moon. In between these phases, the moon’s illuminated surface appears to grow (waxing) to full, and then decrease (waning) to the next new moon.

The moon’s familiar crescent shape is formed by the shadow of the Earth on the moon’s surface and always points relatively north and south in the sky.

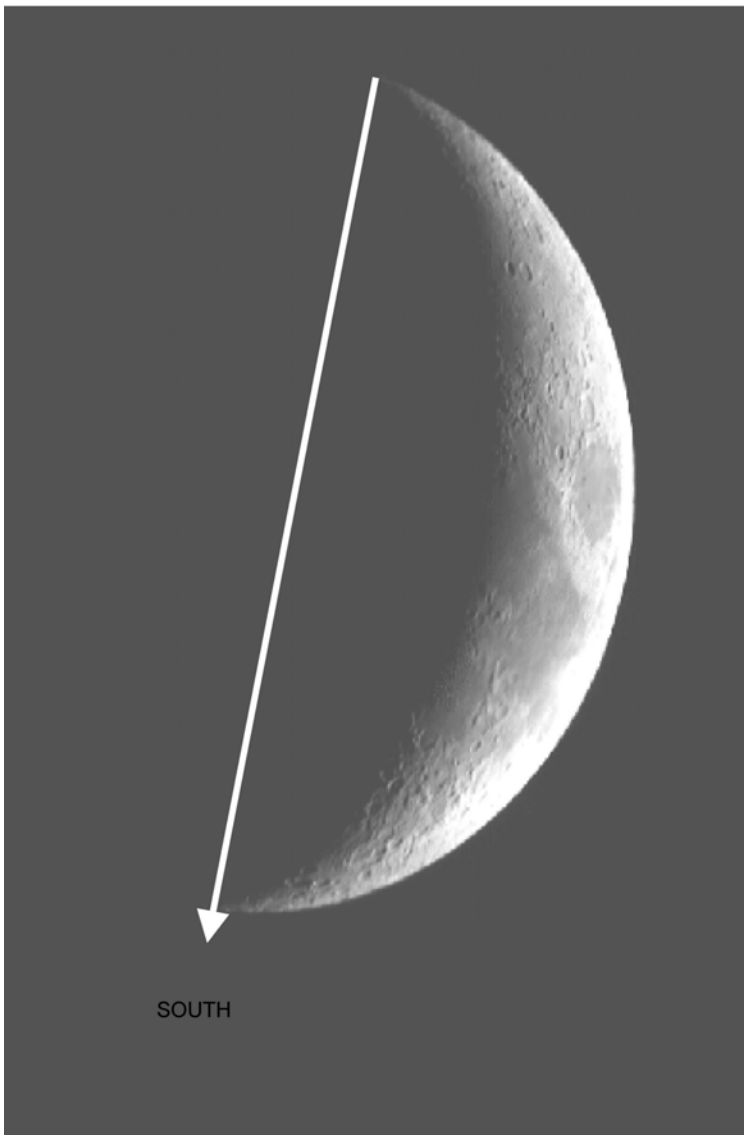


Afreshhorizon.co.uk, Copyright 2008 by A Fresh Horizon. Retrieved November 14, 2007, from http://www.afreshhorizon.co.uk/images/moon_phases.jpg

Figure 4-3-1 Moon Phases

DETERMINE SOUTH BY THE MOON

Drop a line along the points of the crescent moon and project it to the horizon. This point on the horizon is in the general direction of south.



The Calvin College Observatory, The Crescent Moon, Copyright 2001 by The Calvin College Observatory, Grand Rapids, MI. Retrieved, November 14, 2007, from http://www.calvin.edu/academic/phys/observatory/images/moon/

Figure 4-3-2 Determining South by the Moon

This method is by no means accurate, but will give a general direction of north and south.

ACTIVITY

Time: 5 min

OBJECTIVE

The objective of this activity is to have the cadets determine direction using the moon.

RESOURCES

N/A.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

Explain, demonstrate and have the cadets drop an imaginary line along the points of the crescent moon and project that line to the horizon (as illustrated in Figure 4-3-2). This point on the horizon is in the general direction of south.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in the activity will serve as the confirmation of this TP.

Teaching Point 2 **Demonstrate and Have the Cadets Locate the Constellations Required to Find Polaris**

Time: 15 min Method: Demonstration and Performance

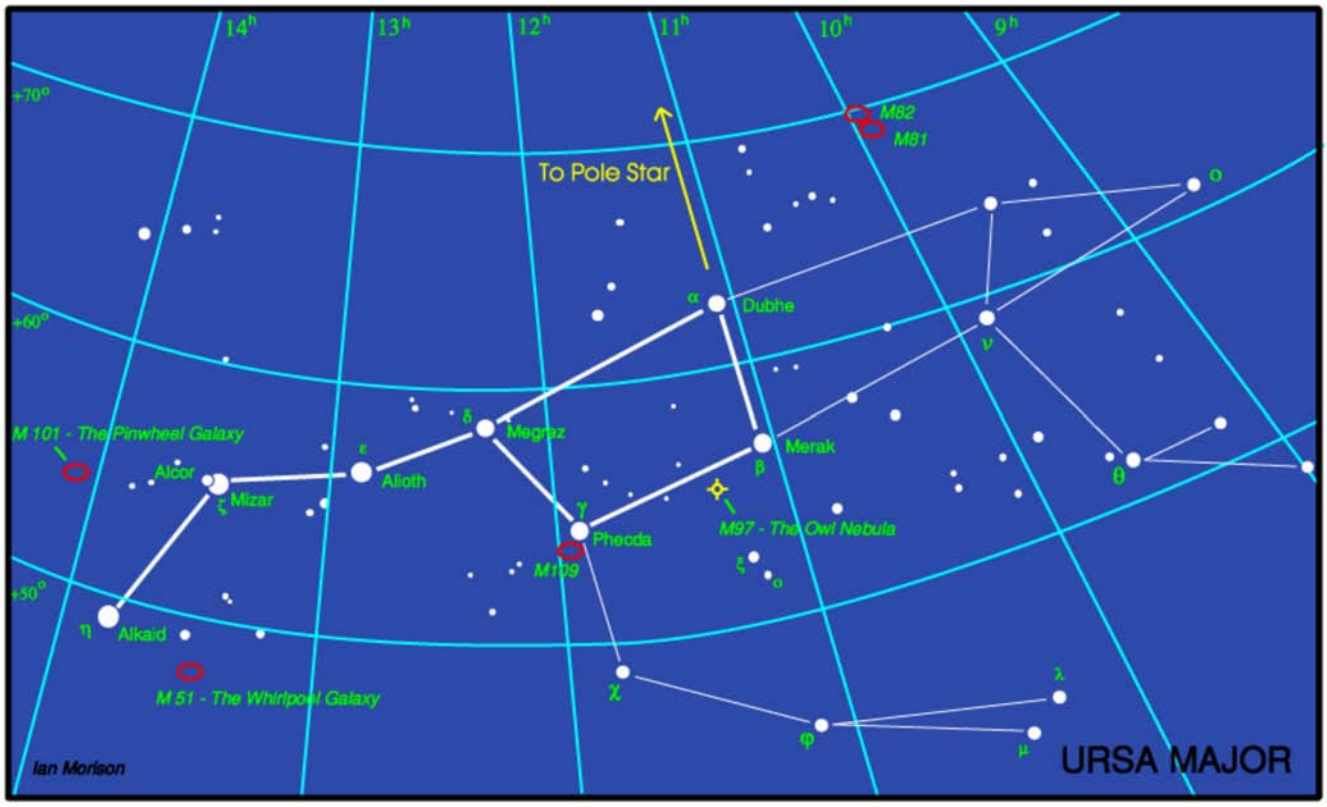
The best watching time for stars is between the moon's last quarter and the first, and three hours after sunset so the sky is dark enough to see the low intensity stars.

CONSTELLATIONS

Constellations are groupings of stars that have been given legendary or historical significance. These groups have been joined together with lines, outlining a figure or symbol, so that they can be found in the sky.

Ursa Major (Big Dipper)

Ursa Major is visible throughout most of the year in the northern hemisphere and is known as the "Great Bear" in Latin. The seven brightest stars are located in the bear's hindquarters and tail and form the well known asterism Big Dipper as it appears to form the shape of a ladle, or dipper shape. The stars Dubhe and Merak, located on the outside edge of the dipper, are also known as "The Pointer" since they point in the direction of Polaris.



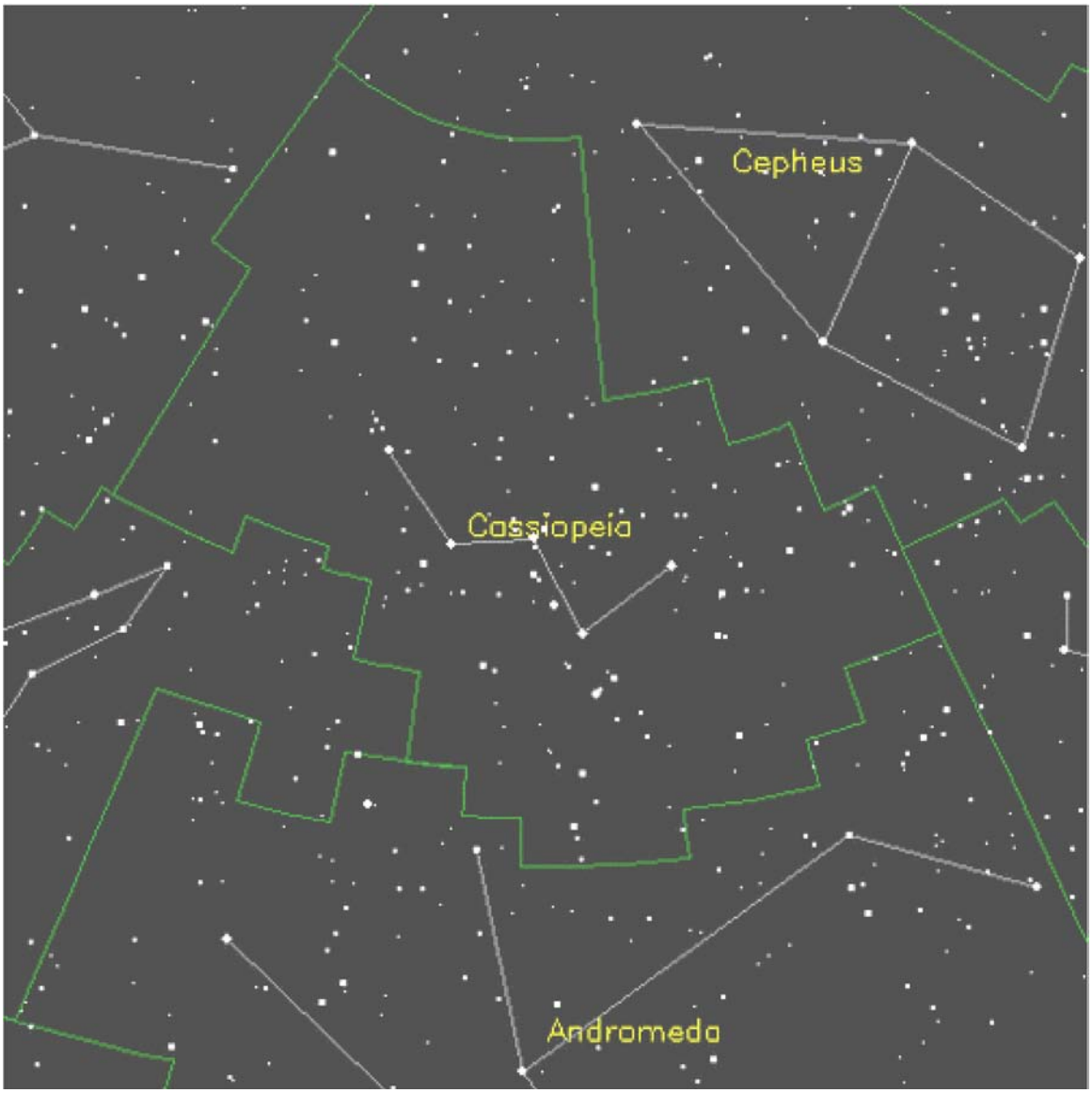
Jobrell Bank Observatory, Copyright 2006 by The University of Manchester, Cheshire, United Kingdom. Retrieved November 14, 2007, from http://www.jb.man.ac.uk/public/Ursamjor.jpg

Figure 4-3-3 Ursa Major

The Big Dipper is not a constellation. It is part of Ursa Major, the Great Bear. The Big Dipper is an asterism, a recognized, but not official, grouping of stars. Some asterisms fall within a single constellation, others cross constellations.

Cassiopeia

Cassiopeia is a northern constellation which in Greek mythology seemed to represent a vain queen who boasted about her unrivalled beauty. It is made up of five stars that resemble a lopsided “M” or “W” depending on its position in the sky.

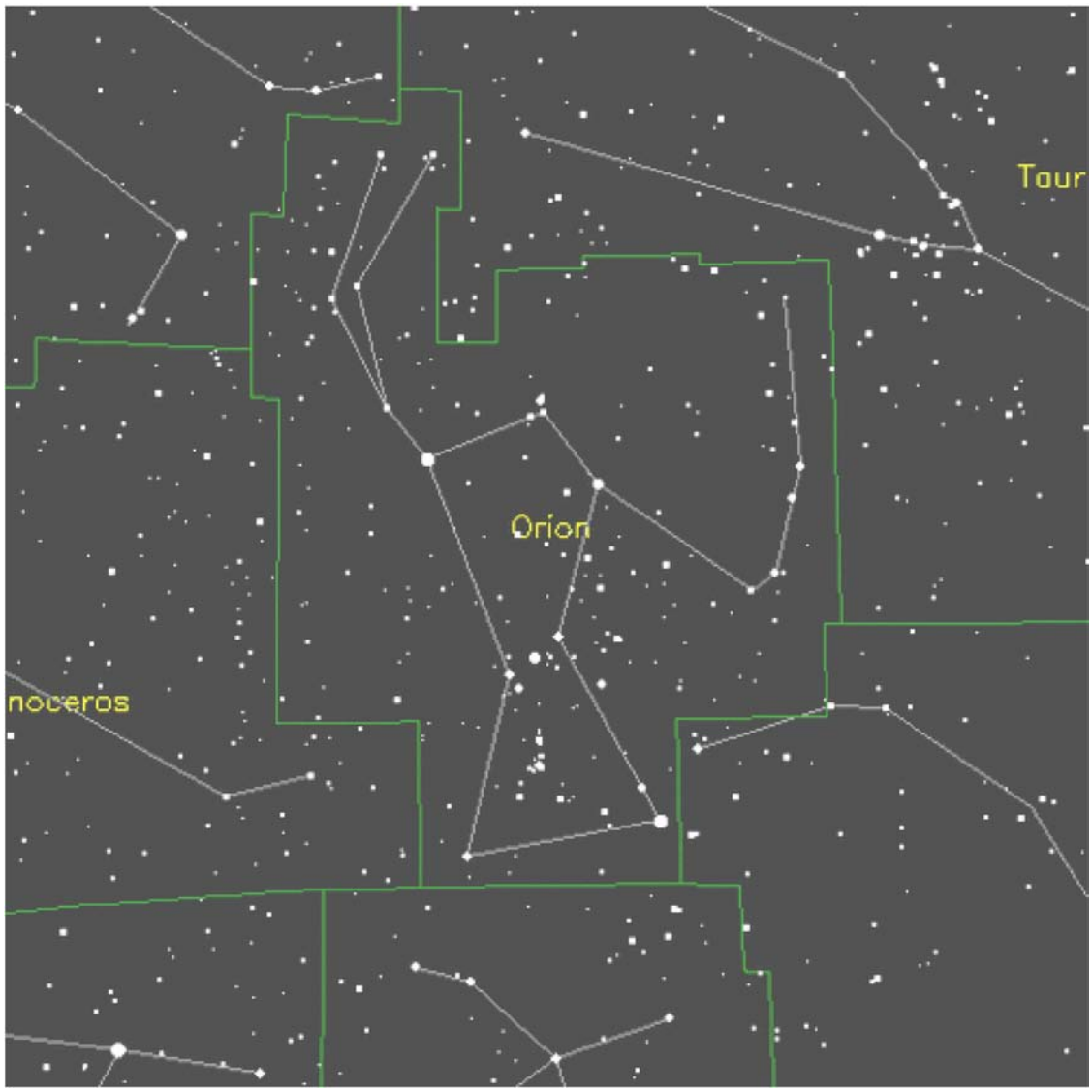


About.com, Copyright 2007 by About Inc. Retrieved November 14, 2007, from http://z.about.com/d/space/1/7/g/l/cassiopeia.gif

Figure 4-3-4 Cassiopeia

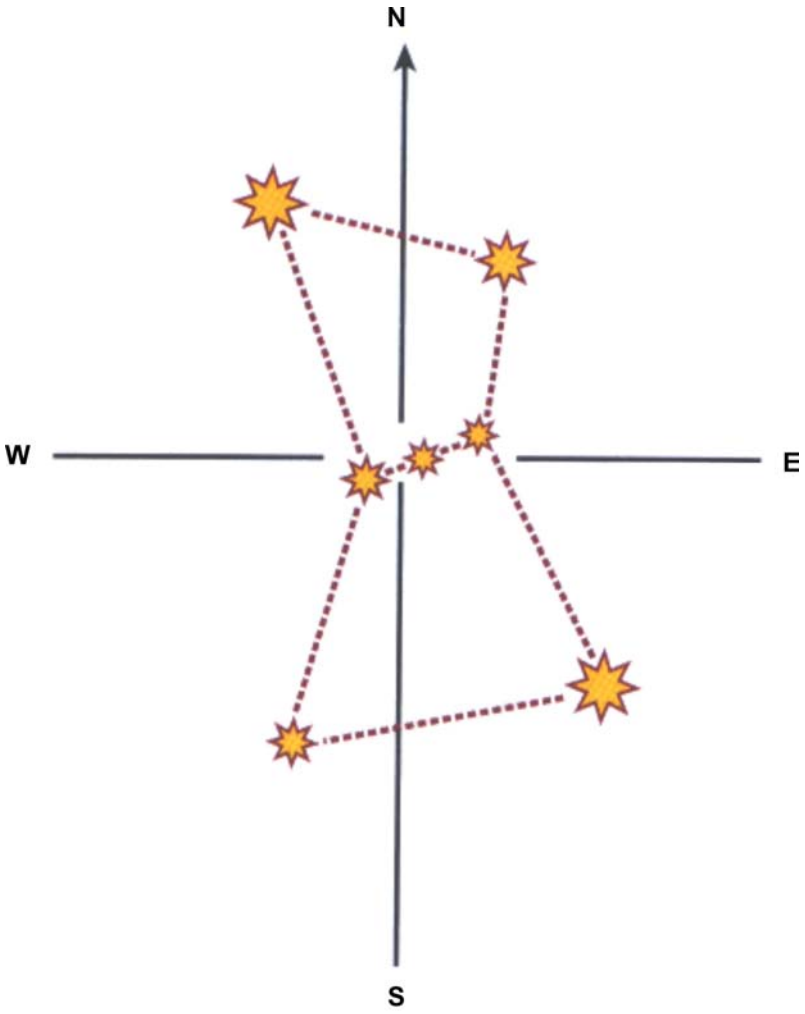
Orion

Orion is a constellation often referred to as The Hunter. It is one of the largest and most visible constellations in the sky. Its brilliant stars are found on the celestial equator and are visible throughout the world. From mid-northern latitudes, Orion is visible in the evening from November to early May and in the morning from late July to November. The constellation of Orion consists of seven stars. The three stars that are close together are the belt of the constellation. The Orion constellation, rises on the horizon due east and sets due west. At the equator it will pass directly overhead, and in the northern hemisphere it will pass south directly overhead. The top of Orion points in the direction of the Pole Star.



About.com, Copyright 2007 by About Inc. Retrieved November 14, 2007, from http://z.about.com/d/space/1/7/t/L/orion.gif

Figure 4-3-5 Orion

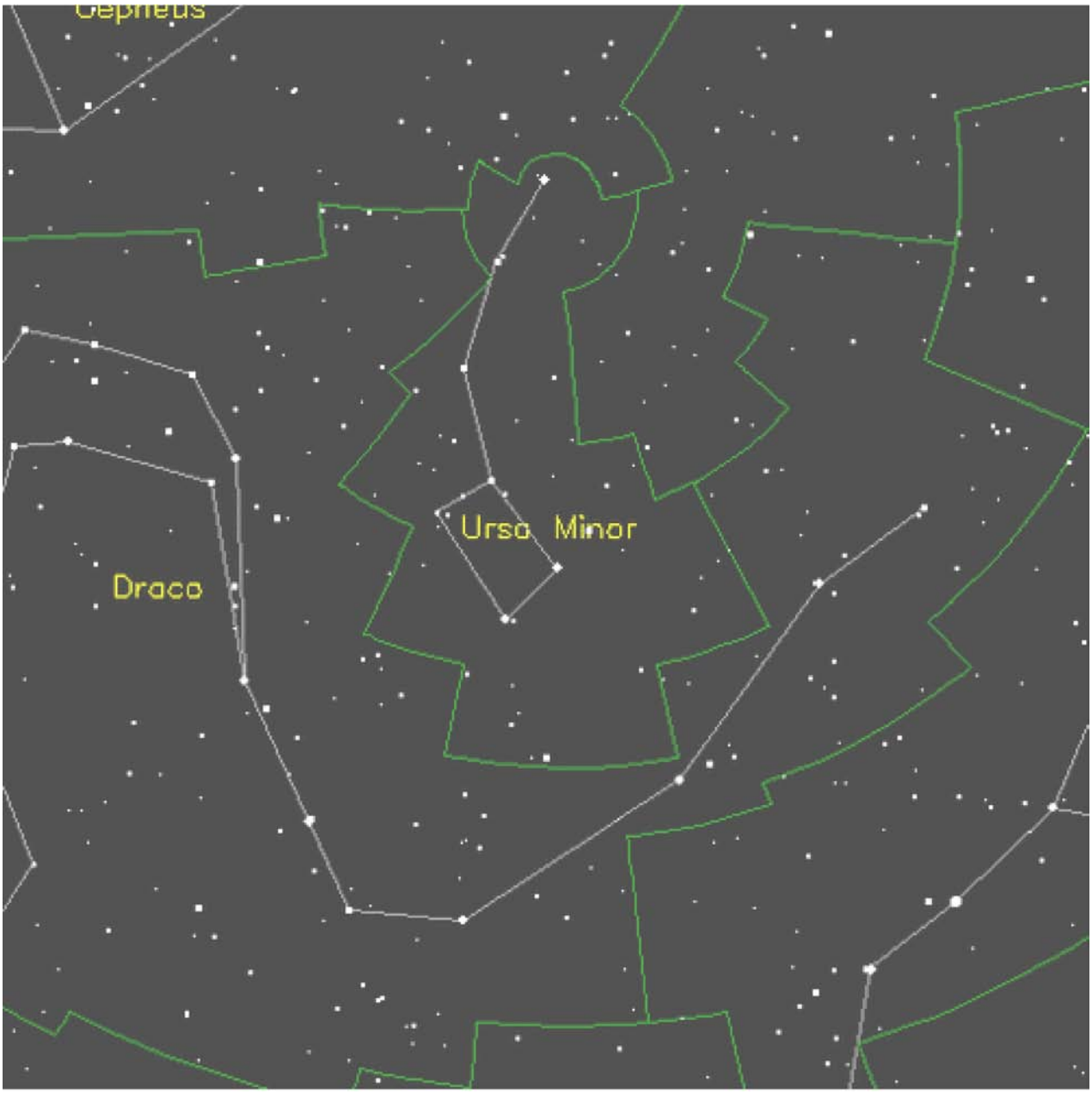


National Association of Search and Rescue, Fundamentals of Search and Rescue, Jones and Bartlett Publishing (p. 76)

Figure 4-3-6 Orion and North

Ursa Minor (Little Dipper)

Ursa Major is a constellation in the northern hemisphere. Its name means “Little Bear” in Latin. Ursa Minor is known as Little Dipper because its seven brightest stars appear to form a ladle, or dipper shape. The star at the end of the dipper’s handle is Polaris, the North or Pole Star.



About.com, Copyright 2007 by About Inc. Retrieved November 14, 2007, from http://z.about.com/d/space/1/7/f/P/ursaminor.gif

Figure 4-3-7 Ursa Minor

ACTIVITY

Time: 10 min

OBJECTIVE

The objective of this activity is to have cadets locate the various constellations.

RESOURCES

- Sky chart,

- Red-filtered flashlight, and
- Compass.

An example of a sky chart is located at Annex D. Sky charts are specific to time and location. Ensure that the sky chart being used in this activity is set for the local place and time.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

Explain, demonstrate and have the cadets locate the various constellations by completing the following steps:

1. Locate north by using a compass.
2. Place the chart upside-down and overhead with the “N” on the chart pointing north.

The east and west printed on the sky chart are on the opposite side of the east and west of an Earth map. The reason is that when the chart is held above the head, the east and west markings will then be the same as on the ground. To better read a sky chart in the dark, use a flashlight with a red filter so night vision is not affected.

3. With the aid of a local sky chart, locate:
   a. Ursa Major,
   b. Cassiopeia,
   c. Orion, and
   d. Ursa Minor.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 2

The cadets’ participation in the activity will serve as the confirmation of this TP.

Teaching Point 3 **Demonstrate and Have the Cadets Locate Polaris**

Time: 10 min Method: Demonstration and Performance

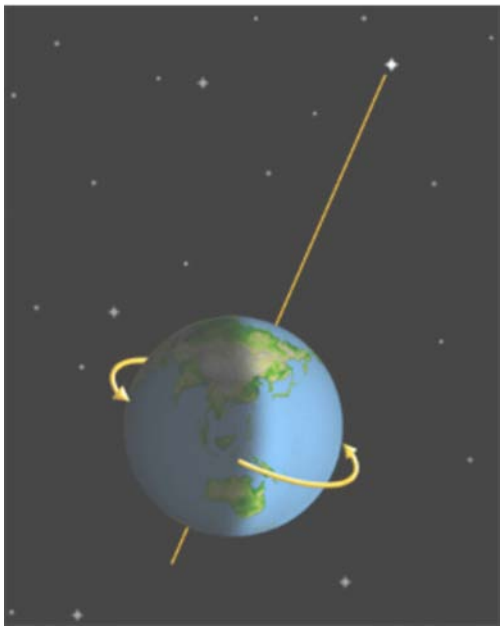
POLARIS

Polaris is more commonly known as the North Star. It is the brightest star in the constellation Ursa Minor. It is very close to the celestial pole (0.7 degrees away from the pole rotation), making it the current Pole Star. The star lies in a direct axis above the North Pole and appears to stand almost motionless in the sky and the other stars seem to rotate around it. Polaris has been close to the actual position of north for the past 1000 years

and during the course of the 21st century it will continue to close in on being in line with True North and will be closest on March 24, 2100 (almost 0.45 degrees away). After that date it will start to pull away and eventually another star will become the new Pole Star.

Locating the North Star

Polaris is located in the constellation Ursa Minor, which contains the group of stars that make up the Little Dipper (as illustrated in Figure 4-3-7). Polaris is the star in the end of the Little Dipper's handle. Often the Little Dipper is not very bright and can be challenging to find.



Lunar and Planetary Institute, Copyright 2007 by Lunar and Planetary Institute, Houston, TX. Retrieved November 14, 2007, from http://www.lpi.usra.edu/education/skytellers/polaris/about.shtml

Figure 4-3-8 Polaris

ACTIVITY

Time: 5 min

OBJECTIVE

The objective of this activity is to have the cadets locate Polaris.

RESOURCES

Handout located in Annex C.

ACTIVITY LAYOUT

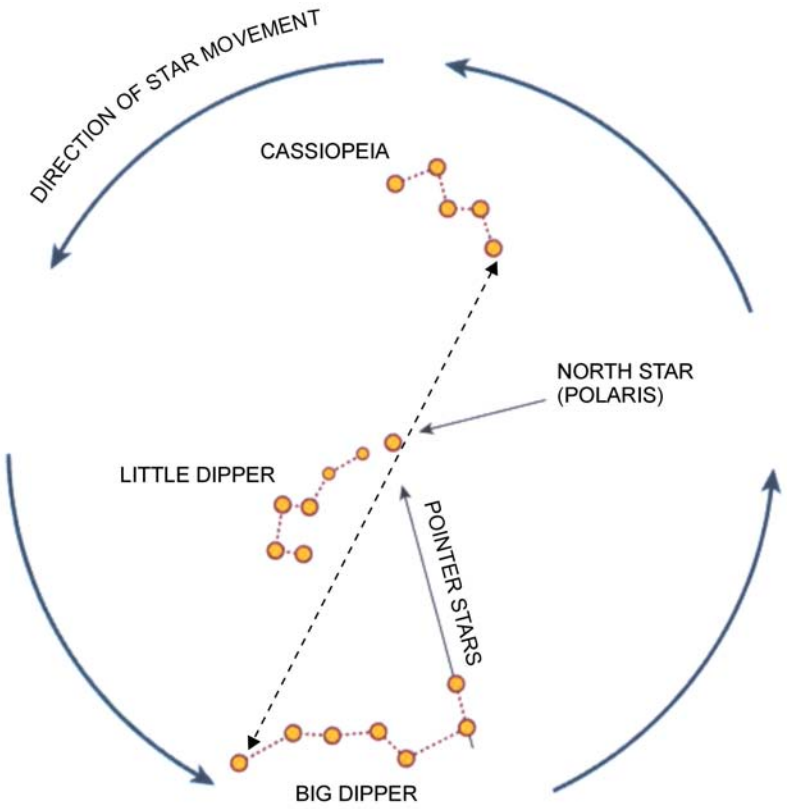
N/A.

ACTIVITY INSTRUCTIONS

Explain, demonstrate and have the cadets locate Polaris, by completing the following steps:

1. Handout copies of Annex C to each cadet.
2. Have the cadets find the constellation Ursa Major (Big Dipper).

3. Have the cadets draw an imaginary line between the two stars (the pointers Merak and Dubhe) at the end of the big dipper's bowl as they will point toward the Pole Star. The distance to the Pole Star is about five times the distance between the pointers.



National Association of Search and Rescue, Fundamentals of Search and Rescue, Jones and Bartlett Publishing (p. 76)

Figure 4-3-9 Finding Polaris

4. Have the cadets locate the constellation Cassiopeia, which is directly across from Ursa Major.

5. Have the cadets draw an imaginary line between the star at the end of Cassiopeia and the last star in the handle of Ursa Major (as illustrated in Figure 4-3-9). Polaris is almost equidistant between Ursa Major and Cassiopeia.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in the activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in determining south by the phases of the moon, locating the various constellations and locating Polaris will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

It is important for the cadets to be able to navigate at night so they can find their way in the dark. In a survival situation being able to determine direction in the dark is a skill that can assist in being rescued.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

C3-002 (ISBN 0-00-653140-7) Wiseman, J. (1999). *The SAS Survival Handbook*. Hammersmith, London: HarperCollins Publishers.

C3-003 (ISBN 1-896713-00-9) Tawrell, P. (1996). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Paul Tawrell.

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ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 4

EO S299.04 – USE BLAZING TECHNIQUES

Total Time:	40 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Prepare a blazed route using grass and rocks for the demonstration in TP 2.

Prepare a route that is 100 m long for the cadets to use during the activity in TP 3.

Photocopy the handout located at Annex E for each cadet.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TP 1 to present basic material on blazing.

Demonstration was chosen for TP 2 as it allows the instructor to explain and demonstrate different blazing techniques.

Performance was chosen for TP 3 as it provides an opportunity for the cadet to practice using blazing techniques under supervision.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have used blazing techniques.

IMPORTANCE

It is important for the cadets to know how to use blazing techniques in a survival situation. Blazing techniques can be used when the survivor leaves their site to find water or build a signal fire and needs to find their way back. Blazing techniques also help searchers find a survival site.

Teaching Point 1 **Explain Reasons for Blazing**

Time: 5 min Method: Interactive Lecture

REASONS FOR BLAZING

Most trails are spotted (marked) coming and going so that they can be seen from both directions of travel.

Leaving and Returning to the Site

When searching for water or finding higher ground to build a signal fire, the survivor may have to walk for a kilometre or more. Blazing will help to establish the route and if one loses their sense of direction they can follow it back to the survival site.

Acting as a Guide to a Ground Search Party

Signs on the ground will draw attention to any presence or past presence and the direction markers will help rescuers to follow someone's trail.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. Why are trails marked in two directions?

Q2. What does blazing help to establish?

Q3. What do signs on the ground draw your attention to?

ANTICIPATED ANSWERS

A1. Most trails are spotted (marked) coming and going so that they can be seen from both directions of travel.

A2. Blazing will help to establish the route and if one loses their sense of direction they can follow it back to the survival site.

A3. Signs on the ground will draw attention to any presence or past presence and the direction markers will help rescuers to follow someone's trail.

Teaching Point 2 **Demonstrate Different Blazing Techniques**

Time: 15 min Method: Demonstration

TRAILBLAZING TECHNIQUES

These are signals to leave behind if leaving the scene of a crash or abandoning a survival site:

- A large arrow shape made to indicate the direction in which one is travelling which will be visible from the air and other direction markers which can be interpreted at ground level. Direction markers could include:
    - rocks or debris placed in an arrow shape;

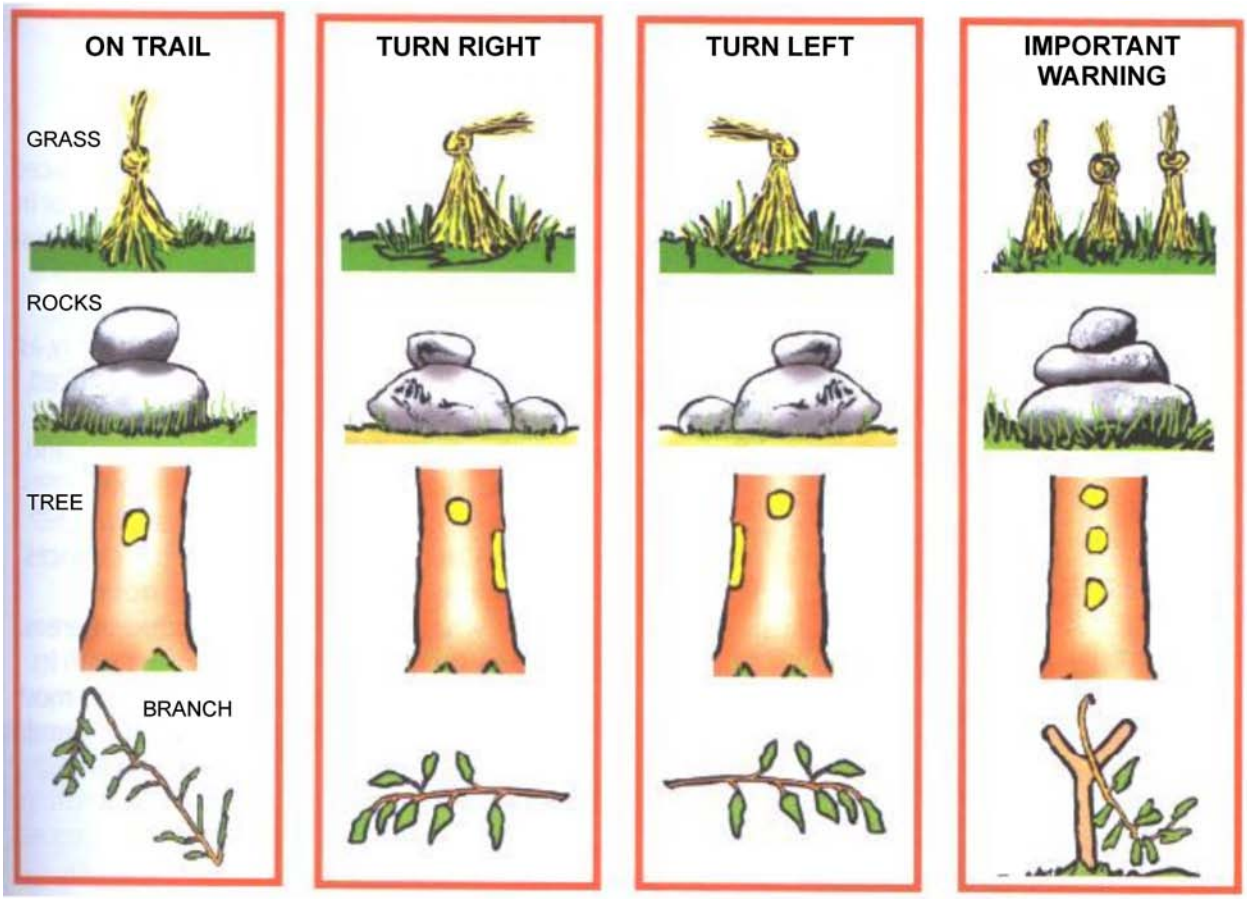
- a stick left in a crooked support, with the top pointing in the direction taken;
- grasses tied in an overhand knot with the end hanging in the direction followed;
- forked branches laid with the fork pointing in the direction followed;
- arrowhead-shape notches cut out of tree trunks indicating a turn;
- small rocks set upon larger rocks, with small rocks beside; and
- a cross of sticks or stones meaning 'Not this way'.

- Continue to make trailblazing signals, not only for people to follow but to establish a route to retrace and guide if someone loses their sense of direction and starts going back on the trail.
- At the survival site, leave written messages in containers to detail plans. Hang them from tripods or trees and draw attention to them with markers.

Show the cadets the previously prepared blazed trail with grass and rocks.

Allow the cadets to ask questions.

Demonstrate trail blazing with branches as the cadets observe.



P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 547)

Figure 4-4-1 Blazing Techniques

To blaze a trail with branches:

1. Find a route to follow for 100 m.
2. Gather branches which are already on the ground.
3. Place the branches along the route for 100 m.
4. Turn the branches around when returning to the starting point.
5. Return the branches to the environment.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. What can direction markers include?

Q2. What is trail blazing?

Q3. What can be left at the survival site?

ANTICIPATED ANSWERS

A1. Direction markers include:

rocks or debris placed in an arrow shape;

a stick left in a crooked support, with the top pointing in the direction taken;

grasses tied in an overhand knot with the end hanging in the direction followed;

forked branches laid with the fork pointing in the direction followed;

arrowhead-shape notches cut out of tree trunks indicating a turn;

small rocks set upon larger rocks, with small rocks beside; and

a cross of sticks or stones meaning 'Not this way'.

A2. These are signals to leave behind if you leave the scene of a crash or abandon a survival site.

A3. At the survival site, leave written messages in containers to detail your plans.

Teaching Point 3 **Have the Cadet Blaze a Trail**

Time: 15 min Method: Performance

Have the cadets blaze a trail using branches.

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets blaze a trail.

RESOURCES

Handout of blazing techniques located at Annex E.

ACTIVITY LAYOUT

100 m route.

ACTIVITY INSTRUCTIONS

1. Distribute the handout located at Annex E to each cadet.
2. Have the cadets:
   a. Gather branches which are already on the ground.
   b. Place the branches along the route for 100 m.
   c. Turn the branches around when returning to the starting point.

d. Return the branches to the environment when the activity is complete.

SAFETY

Ensure the cadets stay in the designated area during this TP.

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in the activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in blazing a trail will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-826/PG-001, Chapter 3, Annex B, Appendix 2 (PC S299).

CLOSING STATEMENT

It is important for the cadets to know how to use blazing techniques in a survival situation. Blazing techniques can be used when the survivor leaves their site to find water or build a signal fire and need to find their way back. Blazing techniques also help searchers find a survival site.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

A3-016 B-GG-217-001/PT-001 DAD. (1983). *Down But Not Out*. Ottawa, ON: Department of National Defence.

C3-003 (ISBN 1-896713-00-9) Tawrell, P. (1996). *Camping and Wilderness Survival: The Ultimate Outdoors Book*. Green Valley, ON: Paul Tawrell.

ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 5

EO S299.05 – DETERMINE DISTANCE ALONG A ROUTE

Total Time:	40 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Measure and mark three 100-m pace courses. One should be on a flat trail/road, another through light bush, and the last through heavier bush, with slopes if possible. Pace courses should be wide enough to allow several cadets to use them at the same time.

Calculate personal pace for 100 m.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

Demonstration and performance was chosen for TP 1 as it allows the instructor to explain and demonstrate pacing while providing an opportunity for the cadets to practice the skill under supervision.

An interactive lecture was chosen for TP 2 as it allows the instructor to discuss basic material and where the cadets can participate by asking or responding to questions and commenting on practicing pacing.

A practical activity was chosen for TP 3 as it is an interactive way for the cadets to experience how different factors will affect their personal pace. This activity contributes to the development of pacing skills and knowledge in a fun and challenging setting.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have determined their personal pace for 100 m and be able to determine the distance between two points using pacing techniques.

IMPORTANCE

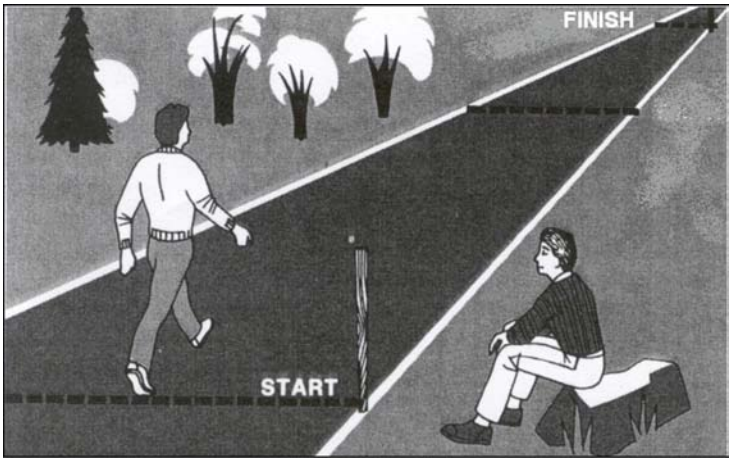
It is important for the cadets to determine distance along a route as it will allow them to better understand the distance they can travel and how terrain can affect their personal pace.

Teaching Point 1 **Explain, Demonstrate and Have the Cadet Pace**

Time: 10 min Method: Demonstration and Performance

DETERMINING A PERSONAL PACE

Being able to determine distance is a key skill for ground navigation. By learning how to determine distance using a personal pace, a cadet will have the skill to determine how far they have travelled, and how far they have to travel to reach their destination. An example of a pace course is illustrated in Figure 4-5-1.



B. Kjellstrom, Be Expert with Map & Compass, Hungry Minds, Inc. (p. 53)

Figure 4-5-1 Determining Distance Using Pacing

Personal Pace. The number of paces a person walks over a distance of 100 m.

COUNTING PACE

There are two basic methods to count pace:

- counting every pace (count every step); or
- counting every other pace (count every left or every right step).

For example:

- counting every pace: 140 paces = 100 m; and
- counting every other pace: 70 paces = 100 m.

CALCULATING DISTANCE

In order to determine distance travelled, the total number of paces travelled is divided by the personal pace and multiplied by 100 m to calculate the number of metres travelled.

Formula:

$$\text{total distance travelled (m)} = \frac{\text{total number of paces}}{\text{personal pace}} \times 100 \text{ m}$$

Example:

$$200 \text{ m} = \frac{140 \text{ paces}}{70} \times 100 \text{ m}$$

Common methods of keeping track of the number of paces travelled include:

- Transferring pebbles from one pocket to another: one pebble for each 100 paces.
- Length of cord with knots—the cord is held with the hand gripping a knot and the hand is advanced one knot down the cord for every 100 paces.
- Combination of knotted cord and pebbles (eg, cord with 10 knots, pebbles transferred for each completed cord [10 knots x 100 paces each = 1000 paces]).

ACTIVITY

Time: 7 min

OBJECTIVE

The objective of this activity is to have the cadets determine their personal pace for 100 m.

RESOURCES

- A 100-m course on a flat trail/road,
- Calculator,
- Paper, and
- Pen/pencil.

ACTIVITY LAYOUT

A 100-m course measured and marked with clearly defined start and end points on a flat trail/road.

ACTIVITY INSTRUCTIONS

1. Have the cadets walk the pace course, counting out loud, being careful to keep an accurate count.
2. Have the cadets walk the pace course three times, noting their pace count each time.
3. Have the cadets calculate their personal pace by averaging their three pace counts.
4. Have the cadets record their personal pace.

Do not walk with someone when determining a personal pace. When people walk together, they automatically adjust their pace length to match the other person's in order to stay together.

SAFETY

Boundaries must be marked and supervised.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in the pacing activity on a flat trail will serve as the confirmation of this TP.

Teaching Point 2 **Discuss Factors That Affect Pacing**

Time: 5 min Method: Interactive Lecture

FACTORS THAT AFFECT PACING

This teaching point should be presented by asking the cadets what they think could affect their personal pace. Ensure to cover any points that are not suggested by the cadets.

Factors that will affect personal pace include:

Terrain. The rougher the ground, the shorter the pace.

Slopes. Pace is shorter going uphill and longer going downhill.

Fatigue. Will shorten a person's pace.

Equipment. Footwear with poor traction will shorten pace. Carrying a heavy load will shorten pace.

Weather. Snow and rain will shorten pace. The wind will increase/decrease pace length if a person is travelling with/against the wind.

Obstacles. Going around small features (eg, trees, bushes) will affect pace count unless compensated for. Compensation methods include:

- **Sidestepping.** Stepping to the side (left/right) enough paces to bypass obstacle, pacing forward past obstacle, side stepping back (right/left) to return to original line of travel. This method maintains pace accuracy, but takes time.

The paces that the cadets sidestep are not added to their total pace count.

- **Alternating Sides.** In this method, the cadet alternates the side (left/right) of the obstacle they pass (eg, last obstacle was passed on the left, next will be on the right). This method is less accurate, but faster.

If obstacles are always bypassed on the same side, the line of travel will veer off in that direction unless a distant steering point (eg, tall tree, hill top, building) is used as a guide.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. How do slopes affect pace?

Q2. How will weather affect pace?

Q3. What can happen if you always bypass obstacles on the same side?

ANTICIPATED ANSWERS

A1. Pace is shorter going uphill, and longer going downhill.

A2. Snow and rain will shorten pace, the wind will increase/decrease pace length if a person is travelling with/against the wind.

A3. The line of travel will veer off in that direction unless a distant steering point (eg, tall tree, hill top, building) is used as a guide.

Teaching Point 3 — **Demonstrate and Have Cadets Practice Determining Distance Using the Pace Counting Method Over Various Terrain**

Time: 20 min — Method: Practical Activity

The cadets will be divided into two groups during the activity to make use of both courses at the same time.

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets determine their personal pace over varied terrain.

RESOURCES

- Two 100-m courses. One should be through light bush and the second through heavier, with slopes if possible,
- Calculator,
- Paper, and
- Pen/pencil.

ACTIVITY LAYOUT

- Two 100-m pace courses measured and marked with clearly defined start and end points. One should be through light bush and the second through heavier bush, with slopes if possible.

ACTIVITY INSTRUCTIONS

1. Inform the cadets that they will be using their personal pace on two more courses to determine the effect of varied terrain on pace.
2. Divide the cadets into two groups; assign one group to each course.
3. Have the cadets, individually, pace the course three times, and then determine the difference between this count and their personal pace.
4. After 10 minutes, have the cadets switch to the other course.
5. Have the cadets, individually, pace the course three times, and then determine the difference between this count and their personal pace.
6. Have the cadets record their findings.

SAFETY

Boundaries must be marked and supervised.

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in the pacing activities will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in determining their personal pace and the effect of various terrain on pace will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-826/PG-001, Chapter 3, Annex B, Appendix 2 (S299 PC).

CLOSING STATEMENT

Being able to determine distance through pacing is an essential skill for ground navigation.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

C0-011 Canadian Orienteering Federation. (1985). *Orienteering Level Two Coaching Certification*. Ottawa, ON: Canadian Orienteering Federation.

C0-111 (ISBN 0-9740820-2-3) Tawrell, P. (2006). *Camping and Wilderness Survival, Second Edition*. Lebanon, NH: Paul Tawrell.

C2-041 (ISBN 0-07-136110-3) Seidman, D., & Cleveland, P. (1995). *The Essential Wilderness Navigator*. Camden, ME: Ragged Mountain Press.

C2-045 (ISBN 1-4018-0961-8) Ford, H. L. (2003). *Landscape Surveying*. Florence, KY: Thomson Delmar Learning.

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ROYAL CANADIAN AIR CADETS

BASIC SURVIVAL

INSTRUCTIONAL GUIDE

SECTION 6

EO S299.06 – FOLLOW A MAGNETIC BEARING

Total Time:	80 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-826/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Choose an area with several prominent objects for the cadets to take bearings on during TP 1. Set the compass's declinations either to zero or for the area.

Set up the course for the chosen activity in TP 2.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

Demonstration and performance was chosen for TP 1 as it allows the instructor to explain and demonstrate following a magnetic bearing while providing an opportunity for the cadets to practice the skill under supervision.

A practical activity was chosen for TP 2 as an interactive way to introduce compass skills in a safe, controlled environment. This activity contributes to the development of compass skills and knowledge in a fun and challenging setting.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have followed a magnetic bearing over various terrain while using a compass.

IMPORTANCE

It is important for the cadets to know how to follow a magnetic bearing—a fundamental ground navigation skill. The cadets will also use this skill as part of the search and rescue (SAR) exercise in EO S297.01 (Act as a Member of a Ground Search and Rescue (SAR) Party, Chapter 3, Section 1).

Teaching Point 1 **Practice Determining the Magnetic Bearing of a Prominent Object**

Time: 15 min Method: Demonstration and Performance

Compasses should be handed out at this time.

For this skill lesson, it is recommended that instruction take the following format:

1. Explain and demonstrate the complete skill while the cadets observe.
2. Explain and demonstrate each step required to complete the skill. Monitor the cadets as they imitate each step.
3. Monitor the cadets' performance as they practice the complete skill.

Note: Assistant instructors may be employed to monitor the cadets' performance.

A compass can be used to determine the magnetic bearing for a direction of travel and from one's current location to a prominent object. The ability to take a magnetic bearing of a prominent object also allows the cadet to look for a prominent object as a steering point when they need to follow a given bearing. A magnetic bearing is a quick and accurate method for describing the direction of travel.

A prominent object is something that is usually tall and easily recognizable (eg, church steeple, tall tree or hilltop).

A-CR-CCP-121/PT-001 (p. 5-42)

Figure 4-6-1 Determining a Magnetic Bearing

To determine the magnetic bearing of a prominent object:

1. Check and set the pre-determined declination on the compass.
2. Hold the compass at eye level, at arm's length, and turn to face the prominent object (as illustrated in Figure 4-6-1).
3. Aim at the object using the compass sight, ensuring the sighting line is in line with the index pointer.
4. Adjust the compass cover so the compass dial is seen in the sighting mirror.
5. Look in the mirror and turn the compass dial until the magnetic needle is over the orienting arrow (red in the bed).
6. Read the number on the compass dial at the luminous index pointer. The magnetic bearing of the prominent object is read at the luminous index pointer.

Inform the cadets that if taking a magnetic bearing of a prominent object, they will get different readings from other cadets unless they are all using the same line of sight for that prominent object.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in taking magnetic bearings will serve as the confirmation of this TP.

Teaching Point 2 **Using a Compass, Cadets Will Follow Given Magnetic Bearings on a Pre-Determined Route Over Various Terrain**

Time: 55 min Method: Practical Activity

Two different activities are detailed here. Decide which activity to conduct based on local conditions, terrain, etc.

The first activity is more structured but there is the possibility of the cadets either following the cadet in front, or just following the path created by previous cadets. The bearing course should have six legs 50–150 m (150–450 ft) in length. The bearing course should end at or near the start point. Marker points for each leg should be bright and easily visible (eg, wooden stake with flagging tape).

The second activity requires less set up, but requires more supervision as the cadets will be active over a much larger area. In this activity the cadets travel a triangular route by following a given magnetic bearing for 100 m, then adding (subtracting) 120 degrees, travelling another 100 m then repeating the step of adding (subtracting) 120 degrees and travelling another 100 m. The cadets should end up at or near their start point.

ACTIVITY 1

OBJECTIVE

The objective of this activity is to have the cadets, using a compass, follow given magnetic bearings on a pre-determined route over various terrain.

RESOURCES

- A bearing course, with pre-determined magnetic bearings and distances, created prior to the lesson, and
- Compass.

ACTIVITY LAYOUT

A large area with a bearing course of six legs 50–150 m (150–450 ft) in length and should end at or near the start point.

ACTIVITY INSTRUCTIONS

1. Brief the cadets on the activity. Remind the cadets to use their pacing skills.
2. Give the cadets the safety bearing to use in case they become lost.
3. Have the cadets, one at a time, at one-minute intervals, start the course with a magnetic bearing and a set distance to travel.
4. Have each cadet note where they stop (as determined by their pacing) in relation to where the marker actually is.
5. When the cadet reaches the marker at the end of the first leg, the details for the second leg will be available (eg, given by a supervisor on a piece of paper).
6. Have the cadets continue through the course to finish at the end of the sixth leg, receiving the details for each leg in succession, and noting where they stopped.

Inform the cadets that it is typical to not end up (as determined by their pacing) exactly where the marker is located. The difference between their start and end points happens because pace varies over rough terrain and obstacles bypassed will affect distance travelled. The cadets should be told to be honest about where they stop and use this information to perfect their pacing skills. It is important to note that the ability to follow a magnetic bearing is only useful if the cadets can stay on course and effectively use their pacing techniques.

SAFETY

A safety bearing shall be given to the cadets in case they become lost.

ACTIVITY 2

OBJECTIVE

The objective of this activity is to have the cadets, using a compass, follow given magnetic bearings on a pre-determined route over various terrain.

RESOURCES

- Pre-determined magnetic bearings, and
- Compass.

ACTIVITY LAYOUT

A large area with varied terrain.

ACTIVITY INSTRUCTIONS

1. Brief the cadets on the activity. Remind the cadets to use their pacing skills.
2. Give the cadets the safety bearing to use in case they become lost.
3. Have the cadets place an object on the ground to act as their start point (object should be easily identifiable as theirs).
4. Have the cadets, individually, with a given magnetic bearing, travel 100 m.
5. Have each cadet add 120 degrees to the given bearing and travel another 100 m.
6. Have each cadet add 120 degrees to their last bearing and travel another 100 m.
7. Have each cadet note where they end in relation to their start point, then move back to their start point.
8. To start the second triangular route have the cadet use their last bearing (from Step 6) and travel 100 m.
9. Have each cadet subtract 120 degrees to their last bearing and travel another 100 m.
10. Have each cadet subtract 120 degrees to their last bearing and travel another 100 m.
11. Have each cadet note where they end in relation to their start point, then move back to their start point.
12. Have each cadet create their own triangle route by choosing a magnetic bearing, adding or subtracting 120 degrees both times for the other legs of the route.

Inform the cadets that it is normal to not end exactly where they started. The difference between their start and end points happens because pace varies over rough terrain and obstacles bypassed will affect distance travelled. The cadets should be told to be honest about where they end and use this information to perfect their pacing skills. It is important to note that the ability to follow a magnetic bearing is only useful if the cadets can stay on course and effectively use their pacing techniques.

Inform the cadets that when 120 degrees is added to their given magnetic bearing, they will be turning to the right. Subtracting 120 degrees, the cadets will be turning to the left.

SAFETY

A safety bearing shall be given to the cadets in case they become lost.

CONFIRMATION OF TEACHING POINT 2

The cadets' participation in the activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in following magnetic bearings will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-826/PG-001, Chapter 3, Annex B, Appendix 2 (S299 PC).

CLOSING STATEMENT

The ability to use magnetic bearings is a fundamental skill of ground navigation. It is also a skill that has applications in other areas such as air navigation and ground SAR.

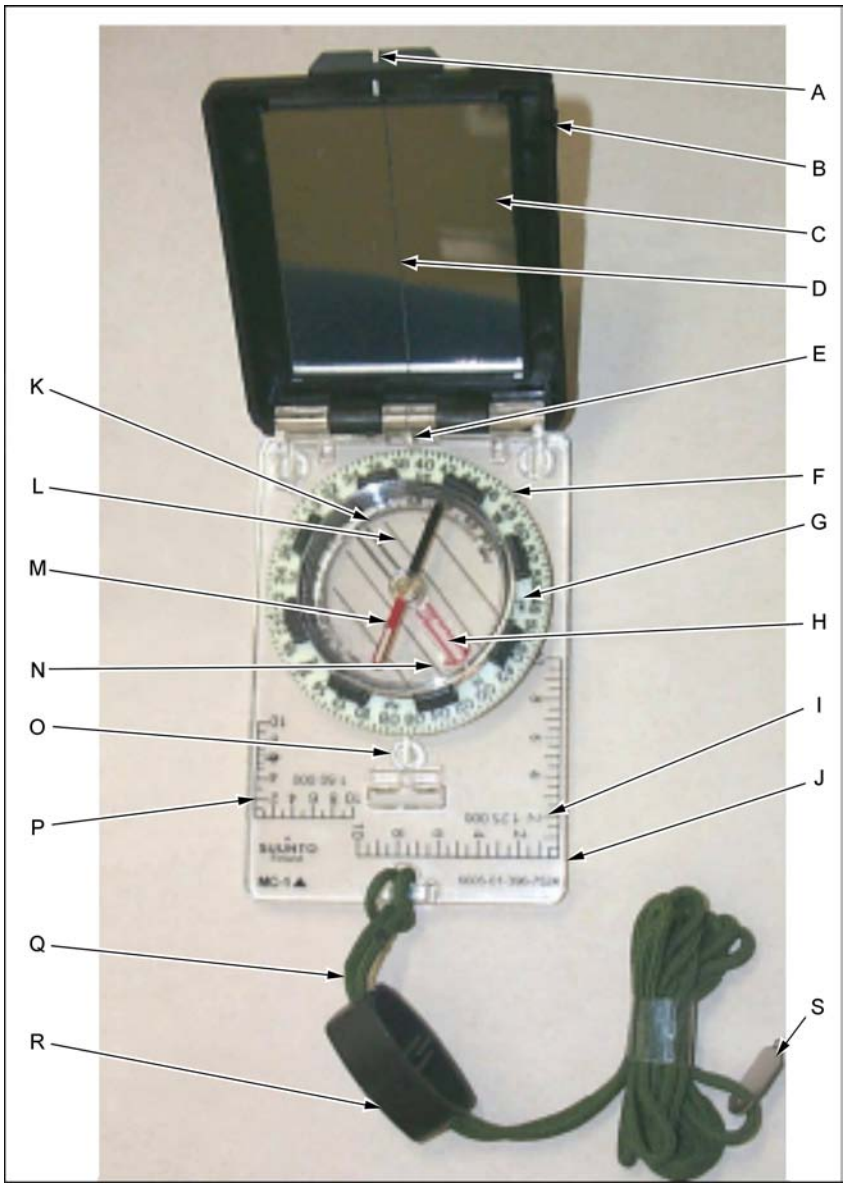
INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

A2-041 B-GL-382-005/PT-001 Canadian Forces. (2006). *Maps, Field Sketching, Compasses and the Global Positioning System*. Ottawa, ON: Department of National Defence.

PARTS OF A COMPASS

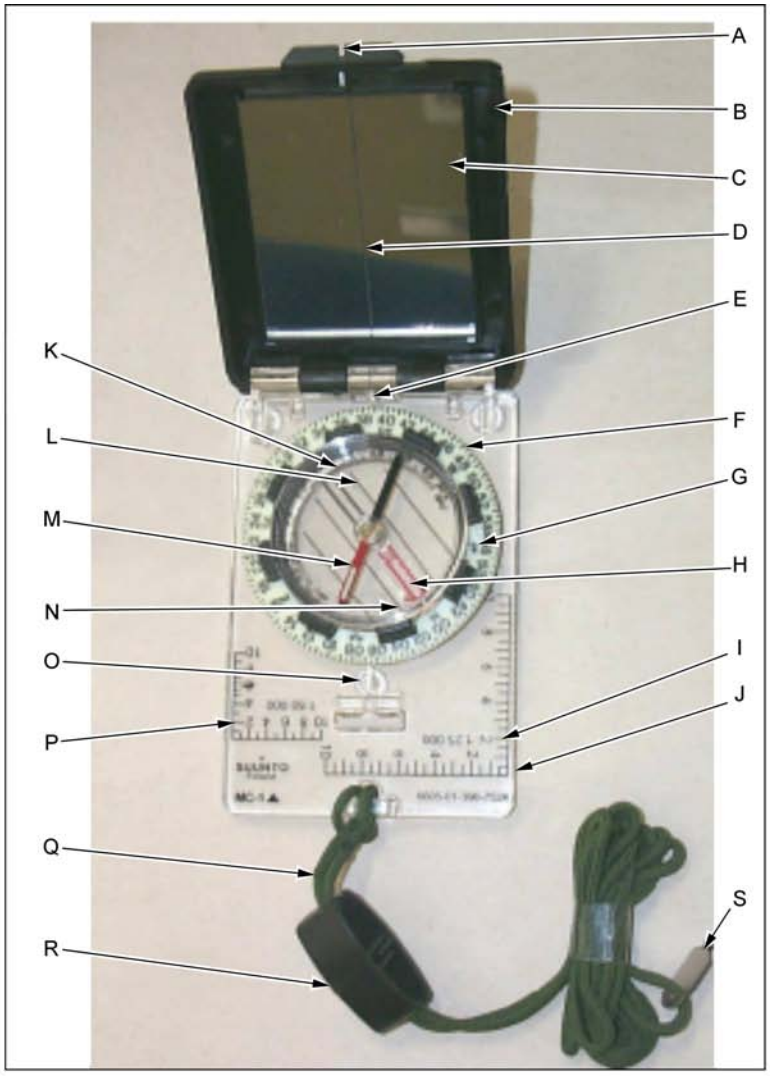


A – Sight	**B** – Compass Cover	**C** – Sighting Mirror	**D** – Sighting Line
E – Luminous Index Point	**F** – Compass Dial	**G** – Dial Graduations	**H** – Orienting Arrows
I – Romer 1:25 000	**J** – Compass Base Plate	**K** – Declination Scale	**L** – Compass Meridian Lines
M – Magnetic Needle	**N** – Luminous Orienting Points	**O** – Luminous Index Point	**P** – Romer 1:50 000
Q – Safety Cord or Lanyard	**R** – Adjustable Wrist Lock	**S** – Screwdriver	**T** – Declination Adjusting Screw (not shown)

A-CR-CCP-121/PT-001 (p. 5-33)

Figure 4A-1 Parts of a Compass

BLANK PARTS OF A COMPASS

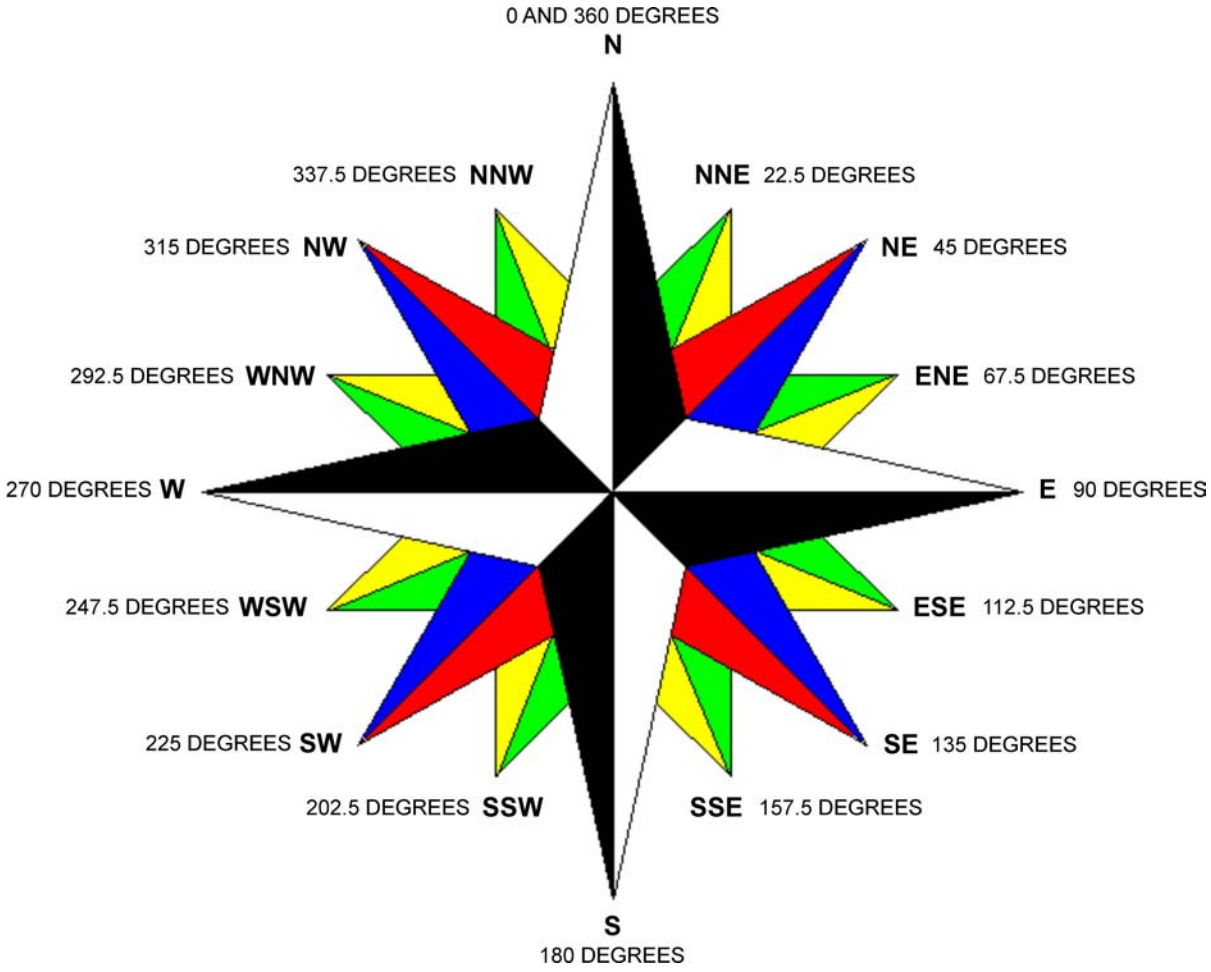


A –	**B –**	**C –**	**D –**
E –	**F –**	**G –**	**H –**
I –	**J –**	**K –**	**L –**
M –	**N –**	**O –**	**P –**
Q –	**R –**	**S –**	**T –**

A-CR-CCP-121/PT-001 (p. 5-33)

Figure 4A-2 Parts of a Compass

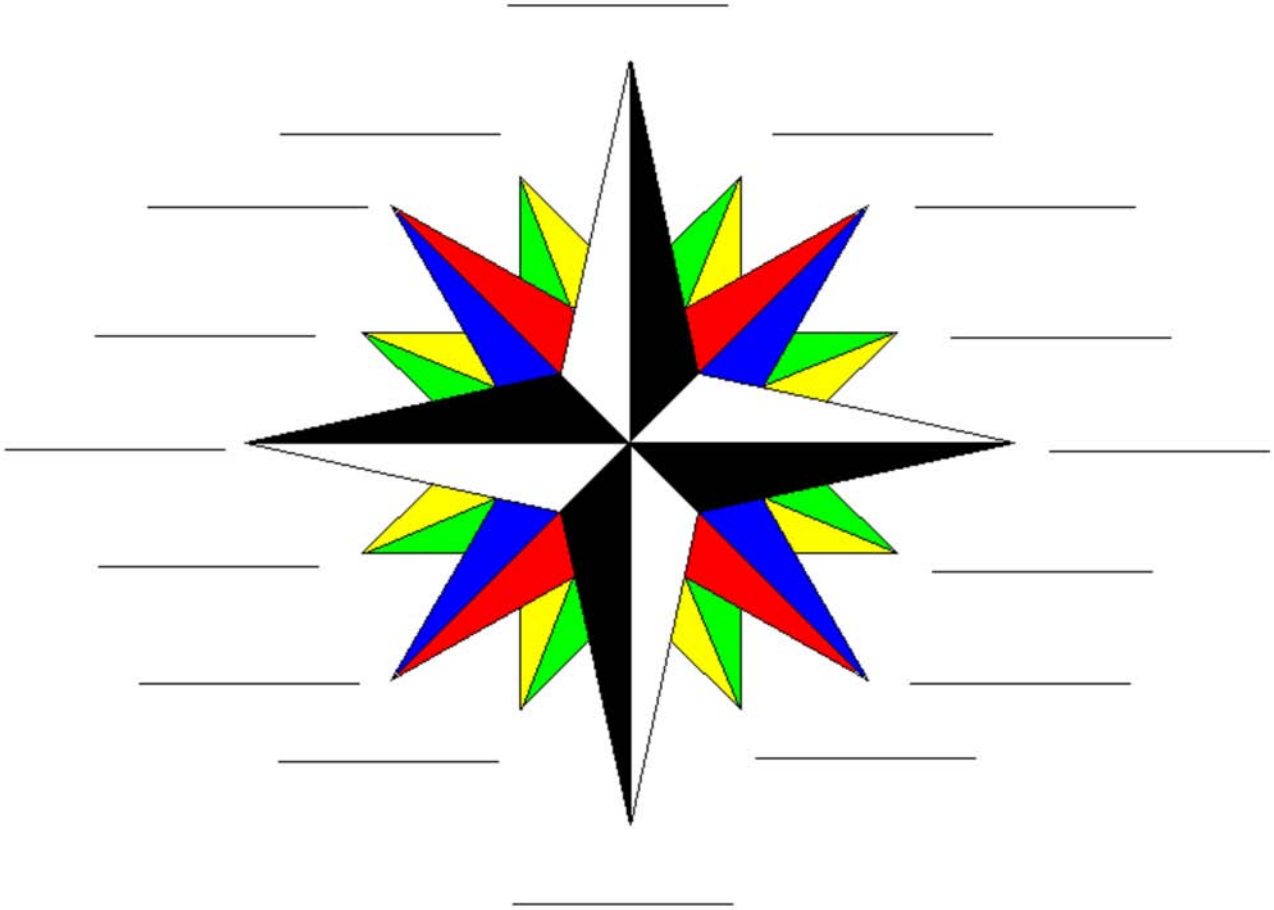
CARDINAL POINTS



D Cdts 3, 2007, Ottawa, ON: Department of National Defence

Figure 4B-1 Cardinal, Inter-Cardinal and Intermediate Points

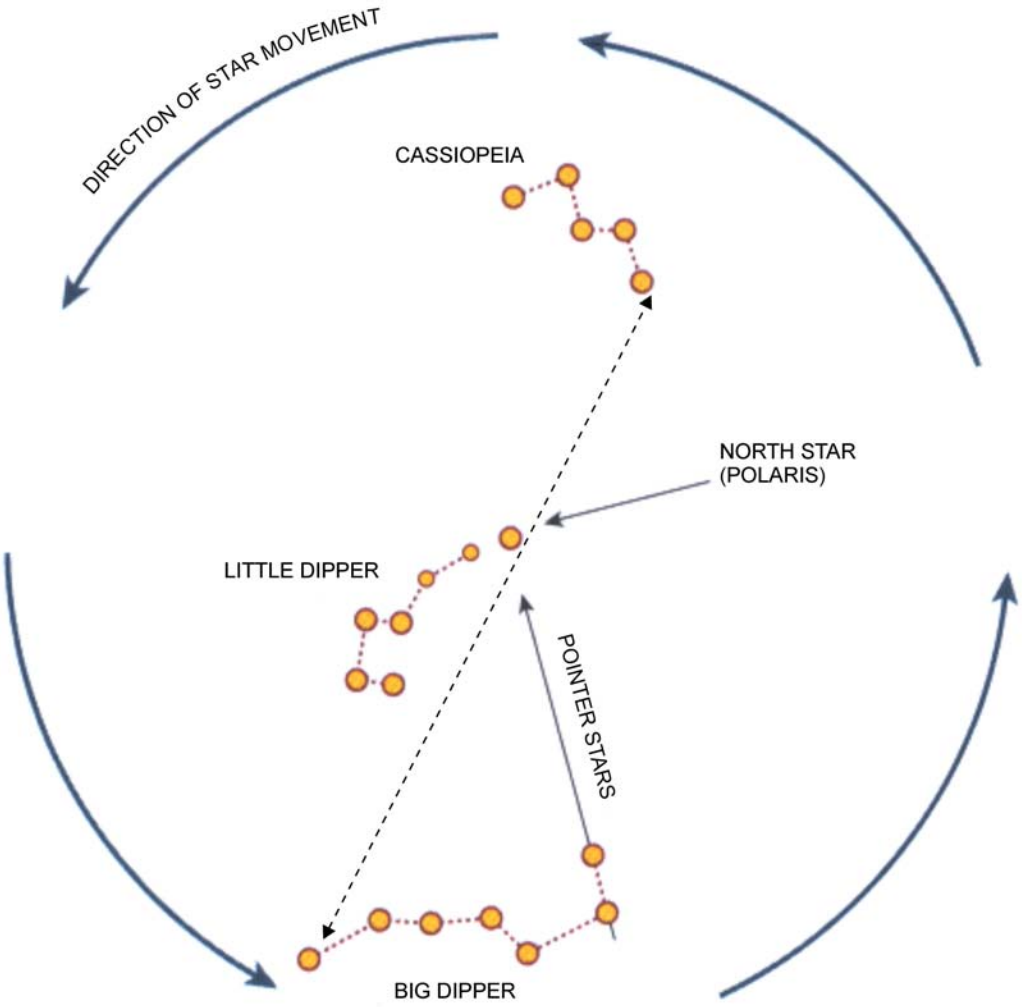
BLANK CARDINAL POINTS



D Cdts 3, 2007, Ottawa, ON: Department of National Defence

Figure 4B-2 Cardinal, Inter-Cardinal and Intermediate Points

FINDING POLARIS



National Association of Search and Rescue, Fundamentals of Search and Rescue, Jones and Bartlett Publishers, Inc. (p. 76)

Figure 4C-1 Finding Polaris

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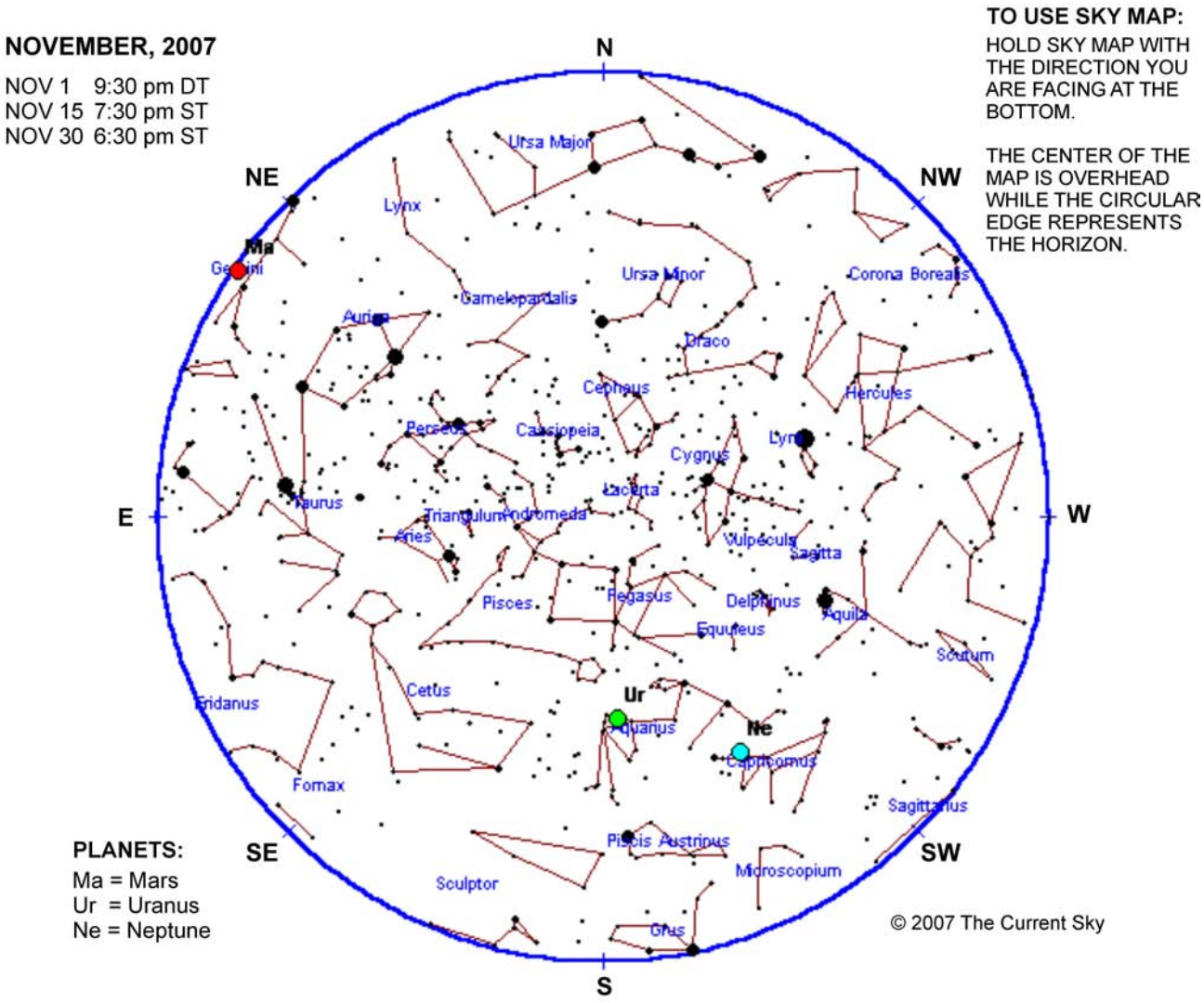
SKY MAP



Sky Map, Calculated for Chicago, Illinois at 41o 50' North Latitude, CyberSky 3.3.1, Copyright 2007 by CyberSky 3.3.1. Retreived November 30, 2007, from http://77illinois.homestead.com/files/astro/skypage.html

Figure 4D-1 Sky Map

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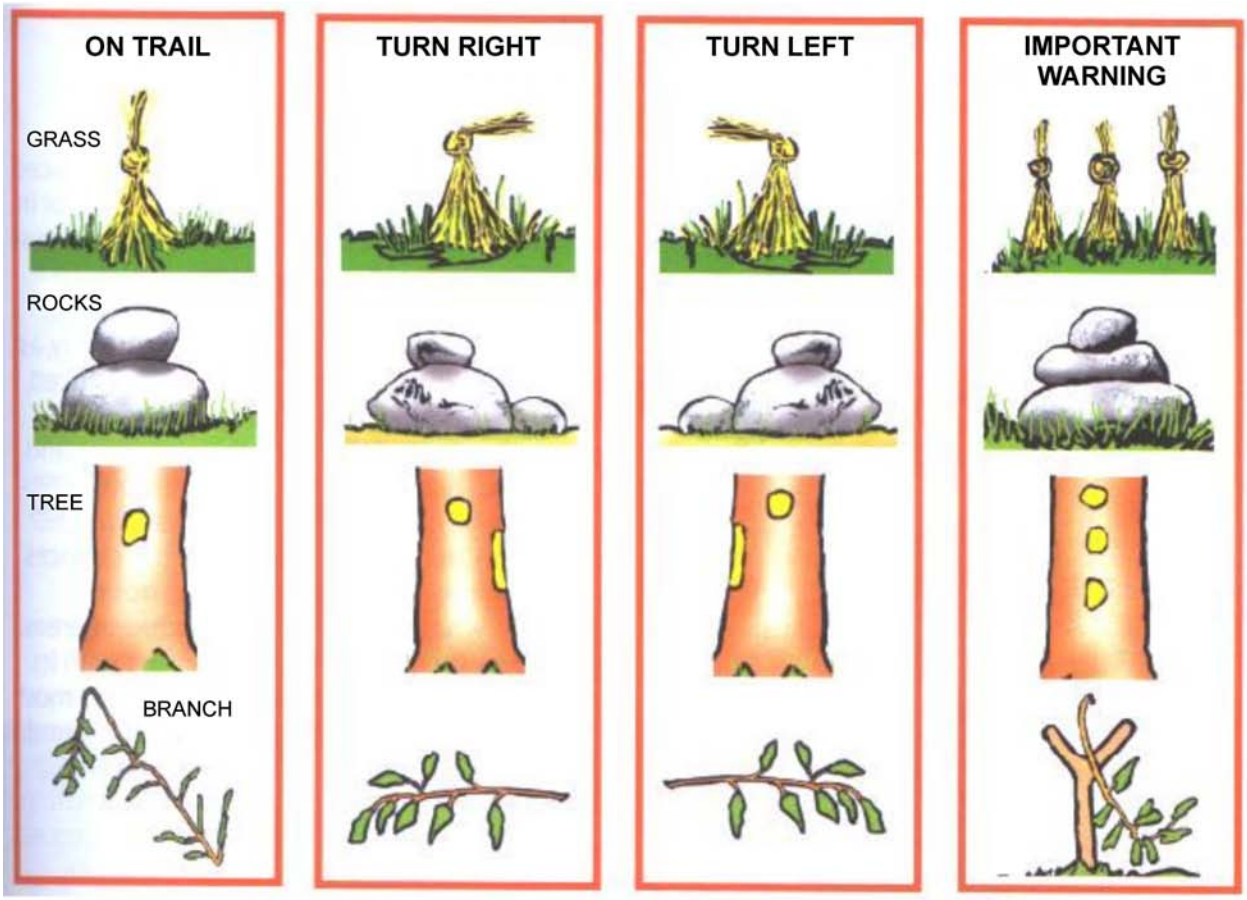
BLAZING TECHNIQUES



P. Tawrell, Camping and Wilderness Survival: The Ultimate Outdoors Book, Paul Tawrell (p. 547)

Figure 4E-1 Blazing Techniques

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